School Shop

vol. XIV no. 6
FEBRUARY 1955

Moral and Spiritual Values in Industrial Education
by Delmar W. Olson
A Phono-Oscillator Circuit
by William H. Mason
The Shop Teacher and Design
by Robert A. Tinkham
Contemporary Aluminum Candelabra
by Regis J. Cunningham

The honor system, as it applies to the use of tools, is demonstrated by a student at Ball State Teachers College. This is one way of teaching moral and spiritual values to industrial-arts classes. Honesty, truthfulness, sharing are all discussed on page 11.

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

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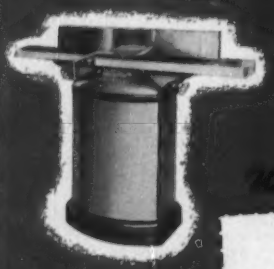

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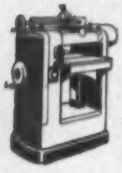

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BPA

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Let's Discard the "Go-It-Alone" Policy

(A Guest Editorial)

"A narrow convention as to learning," observed Alfred North Whitehead, "and as to the procedures of institutions connected with it, has developed . . . Thus, to a really learned man, matter exists in test tubes, animals in cages, art in museums, religion in churches, knowledge in libraries."

The tendency for education to become school-centered constitutes a major problem in each generation. The devoted teacher seems to develop a close attachment to subject-matter content and teaching procedures, those who are not rarely stay long enough to affect education one way or another. These, sooner or later, become ends in themselves, giving to the curriculum a circularity of method, content, and purpose.

Redefinition of educational goals, being difficult, has usually been accomplished by inventing a new kind of school, curriculum, or both. Thus, such innovations as humanism in the fifteenth century, Jefferson's university and Franklin's academy in the eighteenth century, vocational education in the twentieth century and, more recently, life-adjustment education and the community school are best understood as attempts to reorient education to young people, their problems, and their needs.

For the most part, these innovations have consisted of a restatement of policy and program, a rationale based on the needs of contemporary society, and an attractive label to catch the imagination of those who find their work otherwise lacking in significance.

In turn, each attempt has been assimilated into the existing system in modified form but with the label intact. Take vocational education for example.

The evidence establishing a need for education for occupational competency is overwhelming: it provides for young people a framework for understanding the world in which they live, gives purpose to school experiences, meets basic problems of adjustment and personality development, and equips for entrance into adulthood; it replenishes annually the supply of skilled manpower needed to maintain and expand the economy and for defense in cold wars or outright attack; in a systematic manner, it provides orientation and induction of young people into a society whose standard of living demands of them correspondingly high personal, occupational, and civic competencies.

All of this is well known. Surveys show that parents want such programs for their sons and daughters, additional national and state funds are appropriated annually to offset any additional costs, school administrators speak in favor of it, and yet in every school system of any size there is an isolated program in secondary schools labelled "vocational education" but intended only for slow-learners and nonconformists as mute evidence of the fact that the school has not accepted its responsibility to young people who attend, to parents who send them, or to the community which pays the bill.

Lack of adequate programs and absence of intent in other curriculums cannot be charged to an uninformed profession but to school-centered traditions supported by other influences in the profession and in the community. Here is a partial list:

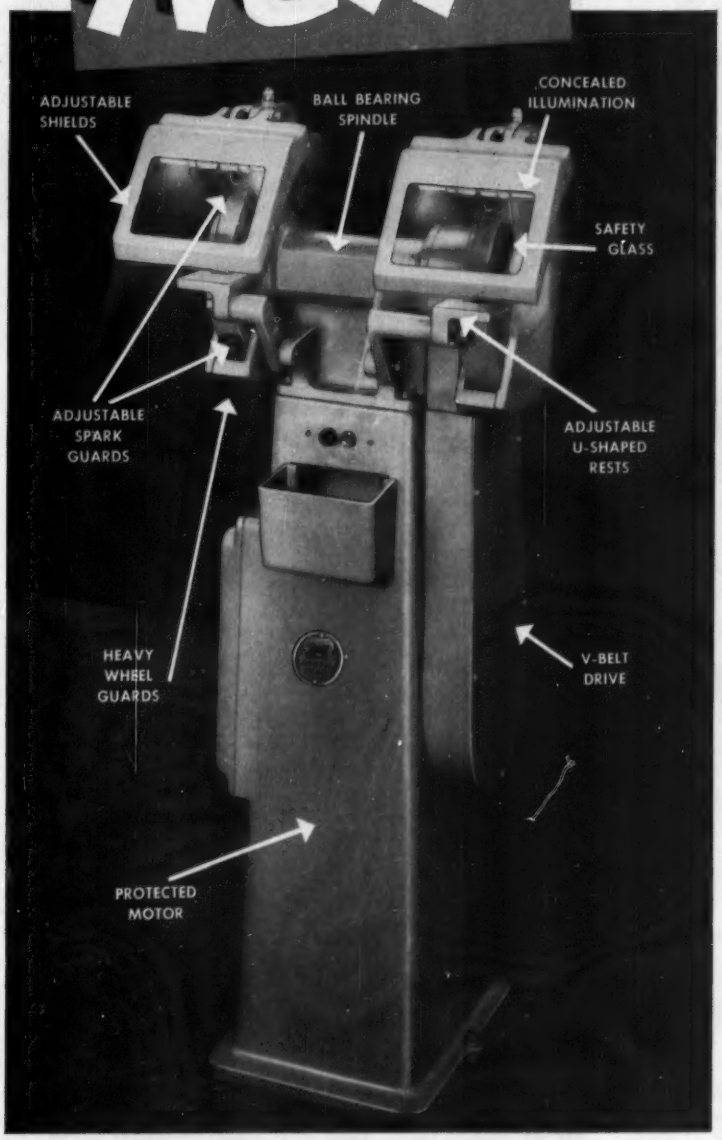
1. Insistence on an education which provides for mobility of social classes.
2. Lack of communication between parents and school administration.
3. Public and parental apathy.
4. Cultural dominance of middle-class values.
5. Insularity of vocational education.
6. Lack of evaluation of school practices in terms of realistic objectives.

Instead of being *a part of,* vocational education has been *apart from,* education. Improvements can only come about through discarding the "go-it-alone" policy.

A first step might well be an affiliation between the American Vocational Association and the National Education Association. It is not inconceivable that both organizations will benefit; certainly working relationships already established will be strengthened, and new ways of working together will be developed. Out of these relationships vocational education should receive the support it needs to carry out its responsibilities to the young people of America.

—Gerald Baysinger, Associate Professor of Industrial Teacher Education, Wayne University, Detroit, Michigan.

New SOUTH BEND Pedestal GRINDER



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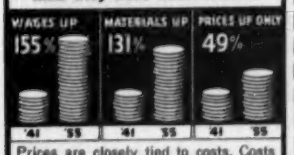

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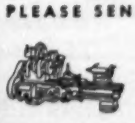

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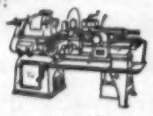

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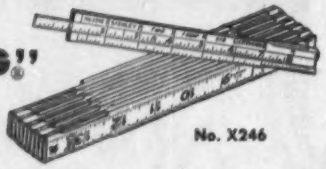

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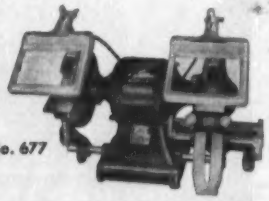

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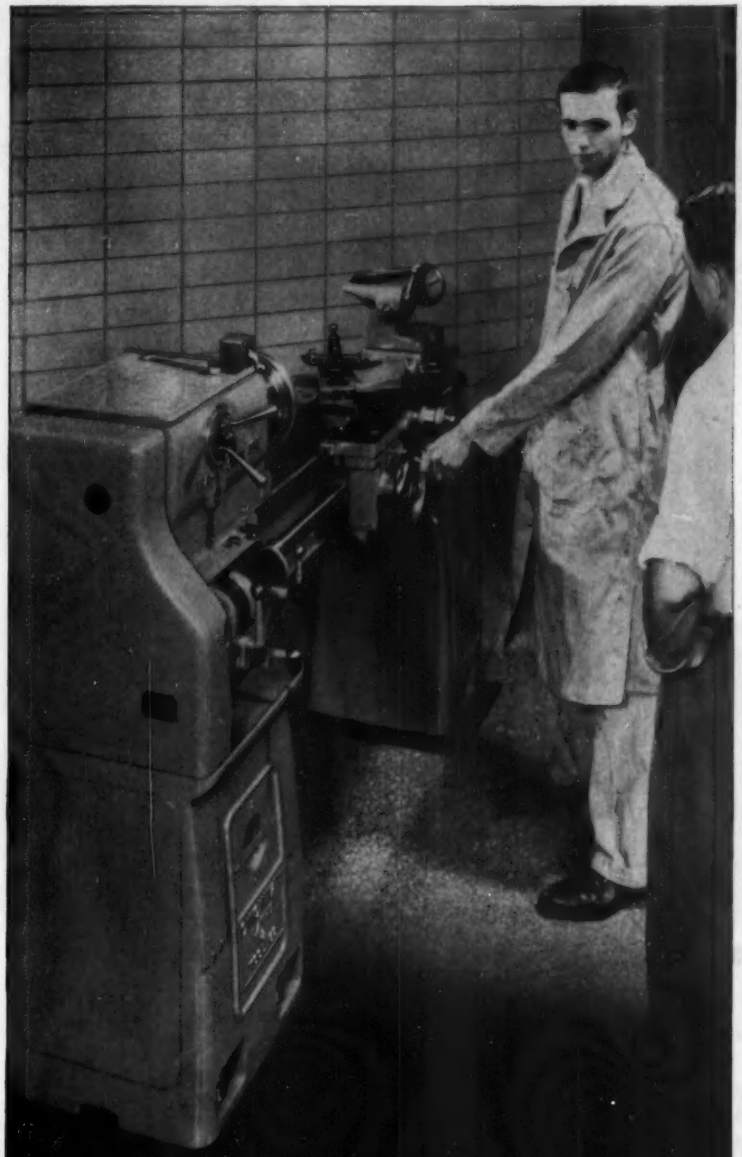

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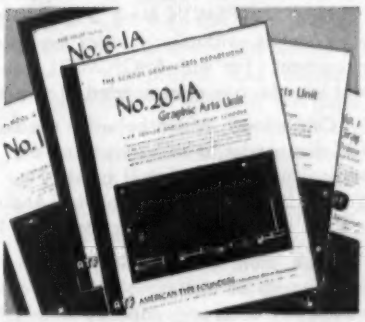

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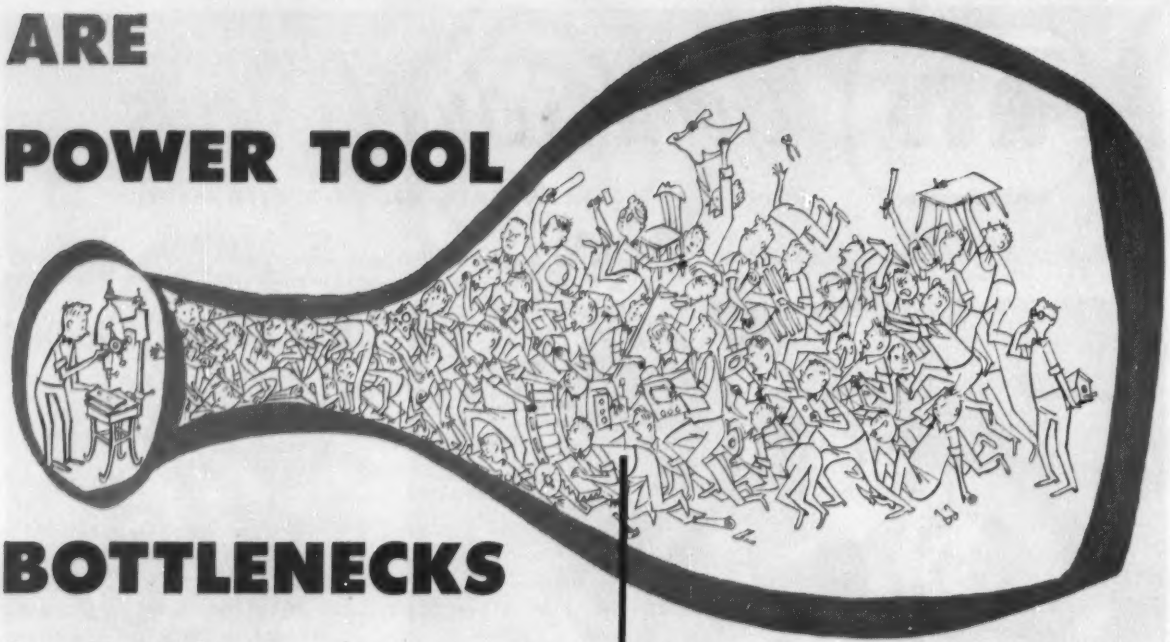

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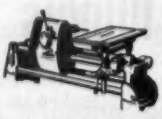

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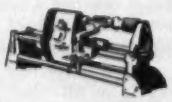

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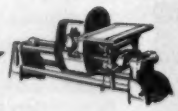

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Moral and Spiritual Values in Industrial Education

By Delmar W. Olson
Professor of Industrial Arts,
Kent, Ohio, State University

INDUSTRIAL arts offers innumerable opportunities for emphasizing and demonstrating the moral and spiritual values which affect boys and girls in ordinary day-to-day living. But statements of objectives and functions in state standards, teacher-preparation programs, classes in education, psychology, philosophy, and such, rarely include any mention of such values among the lists setting the pattern for effective teaching.

Perhaps it is assumed that the teacher is automatically concerned with these values . . . perhaps it is commonly accepted that since the teacher generally lives by a "straight-and-narrow" set of moral and spiritual values, the example he sets will benefit his pupils. I believe that if the teacher will have his pupils maintain higher standards of moral and spiritual living he will have to deliberately and intentionally instruct for it.

For purposes here, moral values are those which have their origin in man as he is able to comprehend religious teachings. They are identified as traits of character which, when made full use of by man, enable him to achieve a higher fulfillment of life's purpose. They are centered around such writings as Paul's instructions to his followers, the Sermon on the Mount, and the Ten Commandments. They are contingent upon respect for self, for man, and for God.

It is assumed, then, that moral values are guides to personal behavior drawn from the spiritual values on which religion stands. Some people may disagree with this interpretation, arguing that these values have their origin elsewhere than in religion. So far as the writer is concerned here, recognition of, agreement on, and dedication to moral and spiritual values is of greater importance for the classroom teacher than their origin.

There was a time when work and worship were the chief activities of man. He taught his son his skills and trained him to worship. To him, both were necessary for survival.

Among the early Jews, work and worship were considered the fundamentals in the education of the child. According to Charles A. Bennett, ". . . The custom was for the boy to go to school in the morning where he was taught by the Rabbis, and to remain at home in the afternoon learning the trade of his father."* The reason for this arrangement is said by Bennett to be found in the Talmud, the book of Jewish law. Following are some of the instructions found in the book:

"As it is your duty to teach your son the law, teach him a trade."

"Disobedience to this ordinance exposes one to just contempt, for thereby the social conditions of all are endangered."

"He who does not have his son taught a trade prepares him to be a robber."

"He who applies himself to study alone is like him who has no God."

"Great is the dignity of labor; it honors man."

"The laborer is allowed to shorten his prayers."

"It is well to add a trade to your studies; you will then be free from sin."

"Beautiful is the intellectual occupation if combined with some practical work."

"He who derives his livelihood from the labor of his hands is as great as he who fears God."

"He who lives on the toil of his hands is greater than he who indulges in idle piety."

Change in religious concept accompanied social and economic change throughout the centuries. With separation of church and state and church and school, formal religious instruction has been declared the function of the church and not of the school. Today, the teacher can help his students gain finer, more abundant living when he himself knows the place of moral and spiritual values and brings them into the classroom.

Because industrial arts achieves its functions largely through work experience with materials in a social environment, it seems that the setting is a very natural one for emphasizing such values. There is opportunity to provide real experiences in honesty, truthfulness, helpfulness, and consideration for others, dependability, and respect for others and self.

Honesty

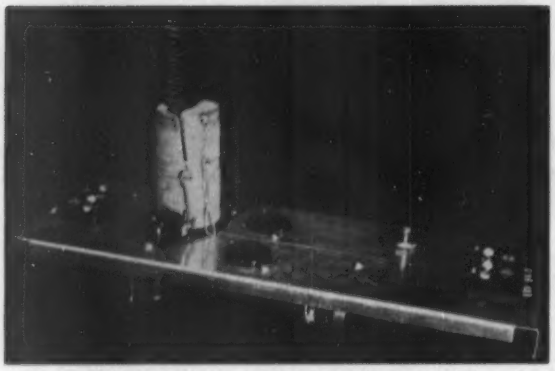
Honest and dishonest behavior are both readily apparent in an industrial-arts class. When the pupil is honest with himself, he strives for good workmanship . . . he does the very best he can at the time. Accuracy and planning thus oppose slovenliness and carelessness. When a mistake is made, the pupil admits it and accounts for it. He accepts the consequences rather than attempting to conceal the error. Instead of rationalizing, he backs up, gets a fresh start, and tries again.

Every project a student makes, no matter what the material, gives him ample opportunity to be honest or dishonest with himself. A joint in two pieces of wood either fits or does not fit. A poor fit can sometimes be concealed with wood putty. The student, however, still knows that the pieces do not fit and if his instructor has emphasized this type of honesty and dishonesty, he becomes the judge of his own behavior.

The pupil can learn about honesty toward others as he works. Should he spoil a piece of his material and steal one from a classmate to conceal his mistake, he is immediately responsible for

(*Continued on page* 32)

*Charles A. Bennett, *History of Manual and Industrial Education Up to 1870*. Peoria, Ill.: Manual Arts Press, 1926.



Top view of phono-oscillator, showing the oscillator coil, tube sockets, switch, tuning capacitor knob, and the terminal strips.

Designed for the electronics area of a general shop

A Phono-Oscillator Circuit

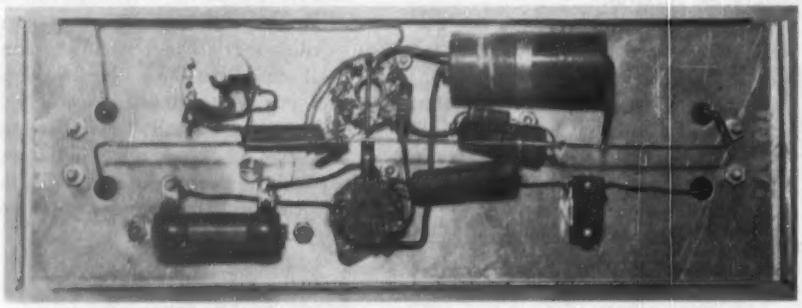
By William H. Mason

Department of General Engineering, Purdue University, Lafayette, Ind.

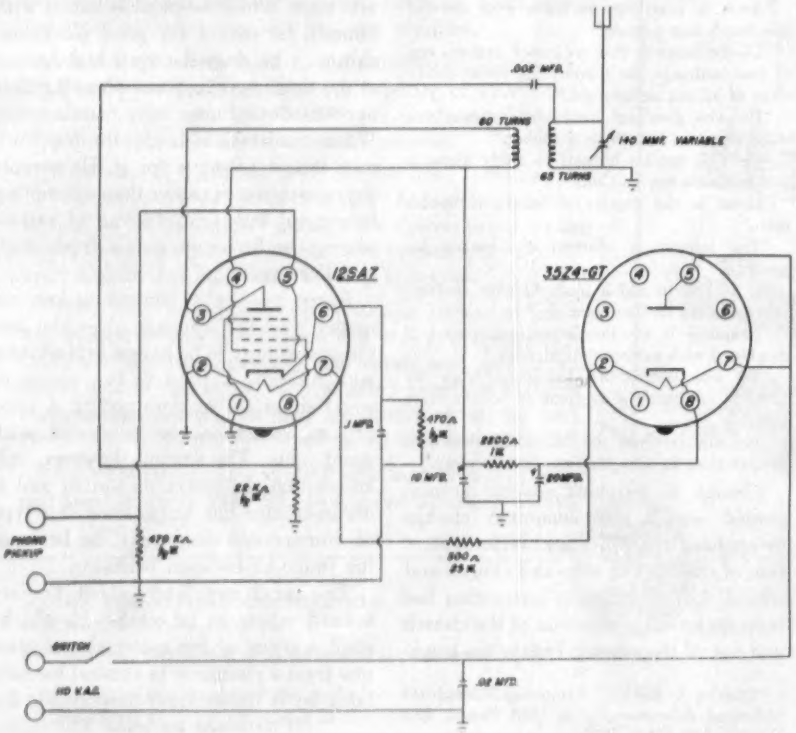
ONE of the problems confronting teachers of general shop desiring to offer a basic area in electronics is the selection, adaptation, and organization of suitable circuits for use in the laboratory work. The following are a number of basic circuits that can be adapted for use in such an area:

One-tube phono-oscillator
One-tube phono-amplifier
Two-tube phono-oscillator
Two-tube phono-amplifier
Photo-electric cell circuit
Two-tube regenerative radio circuit

It is the purpose of this article to present one of these circuits that may be used. In the selection of any circuit for adaptation for laboratory work, factors that should be kept in mind include stability of the circuit, low cost of tubes and components, minimum number of parts, and satisfactory operation of the completed unit. The two-tube phono-oscillator circuit presented herein possesses the above-mentioned features.



Above: The bottom view of the phono-oscillator chassis, showing the position and wiring of components. Below: Schematic diagram of the project, well suited for the general-shop electronics area.



In reality the unit is a miniature broadcasting transmitter. When the unit has been wired properly, and connected to a 110-volt a-c power source and to the pickup arm of a phonograph, it operates in the following manner:

1. The input is an audio-frequency signal of varying voltage generated by the crystal in the pickup arm of the phonograph.

2. The output of the unit is an amplitude modulated (AM) radio frequency (RF) which is radiated from the short length oscillator antenna into the surrounding space. The frequency at which the unit operates may be varied by adjusting the variable tuning capacitor.

3. Any standard broadcast band receiver within range of the unit can pick up this signal when tuned to the same frequency as the oscillator unit and convert it back into audible signals.

4. The distance at which the unit will operate is controlled by the length of the antenna. This distance of radiation should not exceed that set forth in the Federal Communication Commission regulations. A distance of 50 feet is ample. Any excess of this distance will cause interference with other radios in the neighborhood tuned to the same frequency, resulting in complaints that might lead to legal action.

The adaptation of the circuit to the laboratory work will depend on the objectives and organization of the area as determined by the instructor. Kits of parts may be assembled and issued to each student for wiring as exercise work during the laboratory period. When stu-

(*Continued on page* 27)

JOB SHEET "A"

Job: Wiring a Two-Tube Phono-Oscillator Circuit

Tools and Equipment

Diagonal cutters	Screwdriver	Tube Tester
Knife	Phono-test unit	12SA7 tube
Soldering iron	Radio	35Z4-GT tube

Materials

Rosin-core solder	Electronic kit
Hookup wire	Chassis

STEPS	KEY POINTS
1. Procure oscillator kit from the stock room.	1. Check contents of kit against the list of parts. Report missing parts.
MOUNTING PARTS	
2. Mount the following parts on the chassis: Terminal posts (4), Switch, Capacitor (10-20 mfd.), Tube Sockets, Resistor (500 ohm-25 Watt), Oscillator coil, Variable Air Capacitor	2. Use #6-32 machine screws and nuts.
WIRING THE UNIT	
3. Wire a length of No. 14 copper wire from the grounded terminal of the phono-pickup to the grounded terminal of the 110-v ac. See Figure 1.	3. This will serve as a buss bar to which all ground connections will be soldered thus eliminating the use of the chassis as part of the circuit. Spaghetti may be used to cover exposed sections of the buss bar. *Do not permit buss bar to touch chassis at any point.*
4. Wire from one of the 110-v ac terminal posts to one side of the switch.	4. Wiring to terminal posts makes it more convenient when connecting on the 110-v ac power supply leads.
5. Wire from the other side of the switch to pin #7 of the 35Z4.	5. Do not solder this connection now.
6. Wire from pin #7 of the 35Z4 to pin 5 of the 35Z4.	6. Solder these connections now.
7. Wire one end of the 500 ohm resistor to pin #2 of the 35Z4. Wire the other end of the resistor to pin #7 of the 12SA7.	7. This resistor should be mounted securely on the chassis as it will become hot and should not touch any other component.
8. Wire from pin #2 of the 12SA7 to ground.	8. Use the buss bar for grounding.
9. Wire a jumper connection from pin #2 of the 12SA7 to pin #1 on the 12SA7.	9. Keep all wires as short and direct as convenient and near the chassis.
PHONO-PICKUP LEADS	
10. Wire from nongrounded phono-pickup lead terminal to pin #5 of the 12SA7. For the grounded lead see step 3 above.	10. Wiring to terminal posts makes it more convenient when connecting on the leads from the phono-test unit.
OSCILLATOR COIL	
11. Wire from pin #3 of the 12SA7 to top terminal of primary coil.	11. The primary coil is the one having 60 turns of wire.
12. Wire from pin #4 of the 12SA7 to the bottom terminal of the primary coil.	12. Keep wires short and close to the chassis.
13. Wire from the top terminal of the secondary coil to the stator of the variable air capacitor.	13. Be careful not to drop solder on the stator and rotor plates. This could short circuit this part.
14. Wire from the bottom terminal of the secondary coil to the rotor contact of the variable air capacitor.	14. Take care not to bend the stator or rotor plates so as to touch. This will short out this component.
15. Wire from the rotor terminal to ground.	15. Use the buss bar for grounding. Keep the amount of solder on the rotor contact to a minimum since the rotor will not turn if excess solder is built up on this point.
ELECTROLYTIC CAPACITOR	
16. Wire the 20 mfd lead to pin #8 of the 35Z4.	16. Electrolytic capacitors are polarized and must be connected in the circuit accordingly.
17. Wire the 10 mfd lead to pin #4 of the 12SA7.	17. Keep leads short as practical. The polarity of electrolytics are denoted by plus or minus signs on the appropriate ends.
18. Wire the common negative lead to ground.	18. Use the buss bar for grounding.
CAPACITORS	
19. Wire one end of the 0.1 mfd capacitor to pin #6 of the 12SA7. Wire the other end of the component to ground.	19. Use the buss bar for grounding.
20. Wire one end of the .02 mfd capacitor to pin #5 of the 35Z4. Wire the other end of this component to ground.	20. Use the buss bar for grounding. When one end of a capacitor is designated by the words 'outside foil', this end should be connected to the buss bar.
21. Wire one end of the .002 mfd capacitor to pin #8 of the 12SA7. Wire the other end of this component to the stator terminal of the variable tuning capacitor.	21. Position the capacitor so as not to interfere with the rotation of the rotor of the tuning capacitor.
RESISTORS	
22. Wire one end of the 470,000-ohm resistor to pin #5 of the 12SA7. Wire the other end of this part to ground.	22. Use the buss bar for grounding.
23. Wire one end of the 470-ohm resistor to pin #6 of the 12SA7. Wire the other end of this part to ground.	23. Use buss bar for grounding.
24. Wire one end of the 22,000-ohm resistor to pin #8 of the 12SA7. Connect the other end of the resistor to ground.	24. Use buss bar for grounding. Keep leads short and direct.
25. Wire one end of the 2200-ohm resistor to pin #4 of the 12SA7. Connect the other end to pin #8 of the 35Z4.	25. Use spaghetti covering on all exposed leads that might come in contact with other components.
ANTENNA	
26. The antenna wire may be connected to the top terminal of the secondary coil.	26. The length of the antenna should be such that the broadcasting range of the unit will not exceed *50 ft.* Usually 8" to 12" will be sufficient.
TESTING THE COMPLETED UNIT	
27. Recheck all wiring carefully.	27. Inspect and test all solder connections. Have the instructor check the completed unit.
28. Check out a 12SA7 and a 35Z4 tube from the stock room.	28. Test these tubes carefully on the tube tester.
29. Insert the tubes in their proper sockets.	29. Take care not to drop tubes or permit them to roll off the bench.
30. Connect leads from the phono-test unit to the terminal strips of the oscillator unit.	30. Be sure that the leads are connected to the correct terminal posts.
31. Connect leads of a 110-v ac power supply to the terminal posts.	31. Do *not* have the 110-v leads plugged into the power outlet when connecting leads to chassis.
32. Turn on a standard broadcast radio and tune it to a place on the high end of the scale where it will not pick up a station.	32. Keep radio near testing station until the unit has been checked out.
33. Plug in the 110-v ac power supply.	33. Be careful that power leads do not touch each other or the chassis.
34. Turn on the switch of the oscillator unit.	34. Watch to see if the tubes light up.
35. Start the turntable and place the pickup arm on the record.	35. Use a good needle and new record.
36. Tune the oscillator unit to the same frequency as the radio by rotating the variable tuning capacitor.	36. Tuning of the radio and the variable capacitor may be necessary to bring in the best and strongest signal.

The Job is Done Right When:

A. All wires are connected and soldered.
B. No duplication of circuits occurs.
C. Connections are as short and direct as possible.
D. Connections on phantom diagram are completed.
E. The unit operates satisfactorily as prescribed.

Function, not "decoration," is the secret of developing good design in projects

The Shop Teacher and Design

By Robert A. Tinkham
Assistant Professor of Industrial Education
University of Illinois, Urbana

This chisel would be given the stamp of approval on design by any shop teacher. His reasoning would be the same used by an industrial designer when conceiving a new product.

A REVOLUTION has taken place in design, as every shop teacher is well aware. Ornamentation for "cultural" effect has been eliminated for the most part from his electric toaster, his home itself, his automobile, and even from his signature! From a design standpoint he lives in a much simpler, less cluttered world.

In industrial education the problem of design inevitably presents itself because it is an intrinsic part of shop projects. The objects made in the shop are not nebulous or ephemeral. They are solid and have clearly defined shapes. The planning of these shapes, the selecting of materials out of which they are to be made, and the organizing of parts so that they will fit together satisfactorily—these are all problems which come under the heading of "design."

The shop teacher's training and background put him in a particularly advantageous position due to the revolution in design. He understands the characteristics of numerous industrial materials such as wood of various kinds, metals, and plastics. Furthermore, he knows what can be done to these materials in shaping them by hand and with machines.

In many ways the average shop teacher has shown his skill in modern designing although he may not have considered it as such. For example, the typical shop teacher can do an excellent job of designing a tool cabinet. Most teacher-designed tool cabinets are functional, well proportioned, make honest and effective use of materials, and generally meet good design standards.

The same cannot be said, alas, for the same shop teacher when he designs a simple lamp of wood. The reason is obvious: the teacher uses modern functional design methods in designing the tool panel but he uses an outdated set of rules in drawing up plans for the lamp.

To put it differently, in the case of the tool panel he does meaningful problem solving in organizing form; in "designing" the lamp he is primarily striving for what he considers the "artistic."

Similarly, the average shop teacher can arrive at what would be considered good modern design in the layout of his shop—its working areas, work stations, the location and spacing of machinery. Nevertheless, the projects found in the shop, either of his own design or taken from books or magazines, reflect none of his inherent skill in designing.

There is other evidence of the knowledge of design of the shop teacher. Any good teacher understands and appreciates the well designed tools and machines in his field. He is able to discern high quality (which includes design) in selecting tools, oftentimes by merely a glance. Similarly, when he is choosing equipment for his shop he recognizes poor quality in some of the machines found on the market.

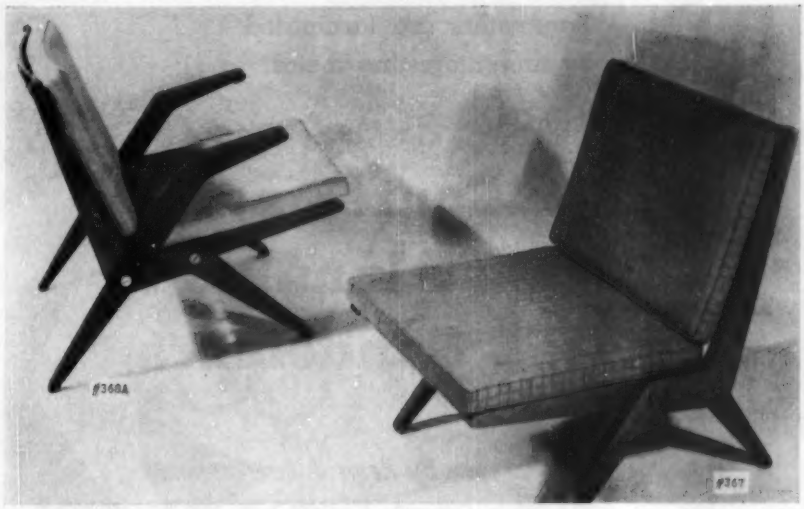
The shop teacher's standards in judging good from bad in tools and machines are surprisingly like the scale of values used by a modern designer when he is conceiving a new product. Their thinking runs almost exactly parallel as they consider such questions as the following:

1. Will the designed object be satisfactory from a functional aspect? Will it do efficiently what it is meant to do?
2. What about function and the "total effect" of the object? Will it be easy to maintain; is it designed for maximum safety; is it well planned for use by average-size human beings; is it worth the space it requires?
3. Is it an accurate reflection of the best thought regarding the specific object or is it inferior because the designer failed to make use of all that is known?
4. Does it show that materials were wisely chosen for certain functions or are there evidences of faulty judgment?
5. Were these materials properly processed and machined?
6. Does the design indicate a real understanding of the materials and the tools used in its manufacture?
7. Is the design as simple as it can be made or does it need reworking?
8. Is it satisfying to the tactile and visual senses?

Many other questions could be listed but these are sufficient to make the point clear that the industrial-arts teacher uses basically the same guides in selecting hand tools and power machines that the designer employs in arriving at a satisfactory design whether it be for a paring knife, a container for a deodorant, or a radio cabinet. These are some of the fundamental questions in the minds of both men.

If the design of an object fails to measure up to these standards, the shop man would reject it, just as the designer would. The time spent on perfecting proportions, establishing flawless balance, and, in general, attempting to refine the aesthetics of a design could be far better utilized on questions like the above.

The industrial-arts teacher is well trained and well versed in functional, honest, simple, and interesting design as it applies to tools and machines. But in



These two interesting solutions by Fabry Associates, New York City, to the problem of chair design illustrate high standards of design. The chair on the left won a "Good Design" award recently.

judging good and poor design in shop projects he may often be hesitant and ill at ease because he feels "out of his element," whereas in the evaluation of modern tool and machine design he has the confidence of one who is sure of his ground.

The teacher should realize that his guides for judgment in the areas where he feels confidence are the primary guides for evaluating any kind of industrial design. They are functionality, simplicity, honesty, and interest. There is no double standard for modern functional design. There are varying degrees of emphasis, depending on technical requirements. For example, the designer of a typewriter is more restricted than one who designs a dining-room table, although the same guides assist both designers in arriving at a better solution.

This familiarity with good design in tools is especially significant in the matter of the design of industrial-arts projects. It will be remembered that Frank Lloyd Wright said that almost any object in the man-made world is, in a sense, a machine or a tool. Wright mentioned several examples of this—a chair and a house were included. This reference to machines or tools should strike a familiar note with the typical industrial-arts teacher who can recognize good design in hand and power equipment.

If the shop teacher used this concept as a starting point, he would soon arrive at the conclusion that all shop projects are fundamentally tools or machines. Their primary purpose is to function in certain predetermined ways. A knife rack is a tool to hold knives; a leather coin purse is a tool to assist its owner in keeping his small change organized and readily available; a letter opener is a tool designed to open mail efficiently; a reading lamp is a machine to distribute light efficiently.

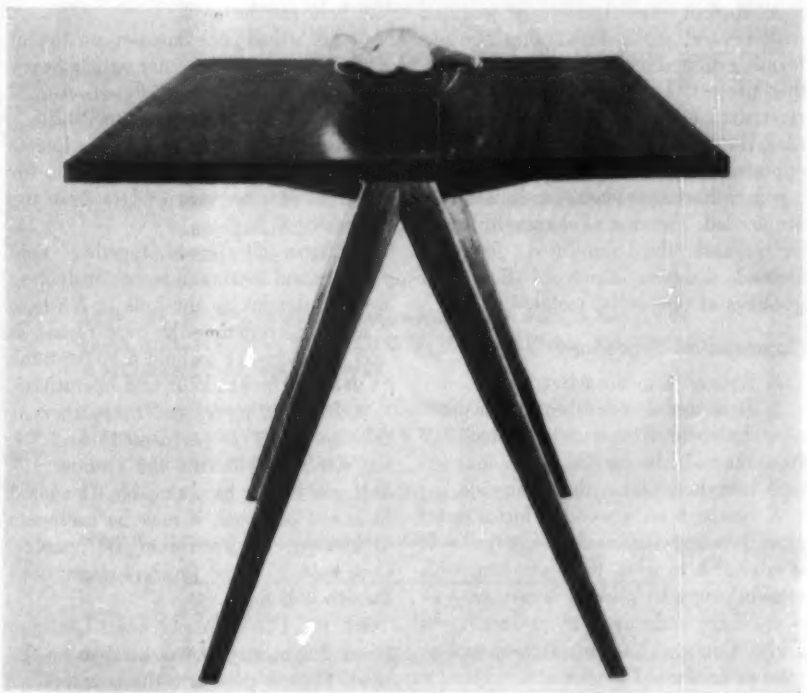
When the project is seen in this way, the shop teacher should be able to feel increased confidence because he already has an excellent set of standards for this kind of judgment. He has long admired the simplicity of a well designed wood chisel although he probably never thought of this tool as an item that might be found in an art museum. He has seen functionality and honesty in the familiar forms of a well designed hammer or pair of calipers or a hacksaw. When the time arrives in which he sees project design in the same light, he is well on his way toward greater understanding and appreciation of design today.

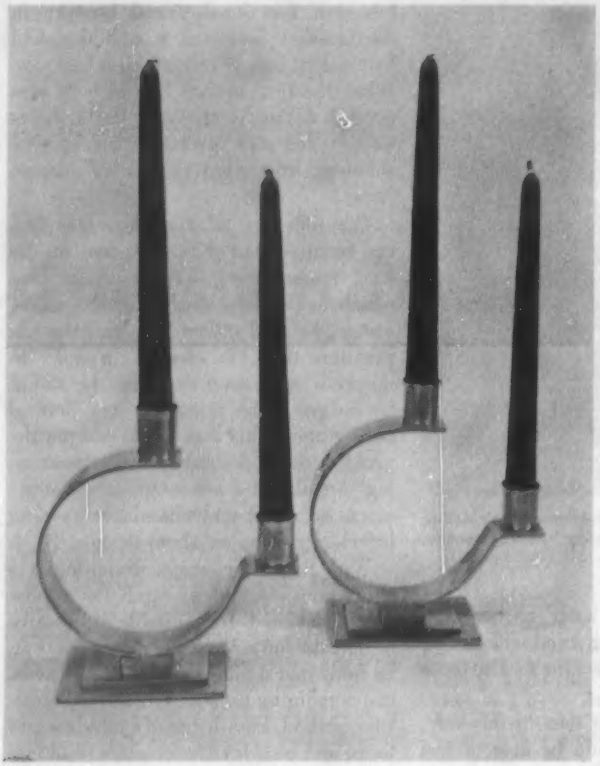
The difficulty of the whole problem can be attributed to the fact that, in the past, he has tried to work in an area which is foreign to him — *decorative* design. He and others have had the impression that "to design" meant "to decorate" and, as a shopman, he would be unique if he possessed any natural ability along this line. If he accepts the premise that "designing" and "decorating" are almost if not completely synonymous, he might understandably have an inferiority complex about design.

With this old concept, designing is a chore consisting of a search for applicable rules and for suitable decorative designs to copy. With the newer concept, he finds that designing is a natural process, combining functional analysis, scientific method, knowledge of materials and tools, and imaginative, creative thinking.

Shop teachers are already using the basic approach of modern design in other areas of their work. The next step is to transfer this approach to the designing of projects. When this happens, shop teachers will be abreast of the best approach of modern industrial designers. ★

This compass table by Allan Gould Designs, Inc., features an inverted-V base (suggested by the arms of a compass) which allows plenty of leg room for diners. It also won a "Good Design" award.





Making these candelabra gives the youngsters an opportunity to learn many fundamentals of metal forming. (Ford Motor Co. photo.)

Youngsters are fascinated by this interesting metal

Contemporary Aluminum Candelabra

By Regis J. Cunningham

Catonsville, Maryland, Junior High School

WORKING with 1/8" thick aluminum is fascinating to junior-high boys so this pleasing and interesting aluminum candelabrum is a popular project with both the youngsters and their parents who appreciate the clean contemporary design. Moreover, aluminum is easier to manipulate than band iron and the appearance of the completed article is more attractive.

A student may become acquainted with several methods of shaping and forming this interesting metal through this project. He will learn to anneal, rivet, drill, countersink, saw, square, and file. The candelabrum presents a good opportunity to teach about the different types of hacksaw blades and files that are needed. The ease of shaping this material and the simplified finishing method illustrate some of the good qualities of this useful metal.

Construction Procedure

1. Square *B* to the correct size.

2. Drill and countersink the two 1/8" rivet holes in *B* that are located 5/8" from the ends. Be careful not to countersink both holes from the same side.

3. Shape *B* on a wooden form, metal pipe, bending jig, or forming rolls. It is advisable to wrap the aluminum with masking tape to prevent scratches.

4. Shape ends of *B* by tightening in a vise. Caution: Use soft aluminum vise jaws or hardwood blocks.

5. Shape bottom of *A* on a round metal bar as shown in Figure 1. Anneal frequently and stretch the metal evenly with a bumping hammer. (Great care should be taken with the annealing of the tube in order not to melt it and discourage the student. It is advisable to make a practice piece or two from the tubing in order to perfect the technique.) Locate the center and drill a 1/8" hole for the rivet.

6. Set a ball-pein hammer on top of *A*. By tapping the hammer with a heavy mallet, the rim may be flared. Anneal rim before performing this operation.

7. Square *C*, *D*, and *E* to size. Locate center of each and drill a 1/8" hole for the rivet. Remove sharp edges from top surfaces.

8. Place all pieces together temporarily and locate the point for drilling and countersinking the hole in *B* where it is to be riveted to the base pieces. It may be necessary to hold a countersink or drill in the hand for this operation.

9. Rivet *B*, *C*, *D*, and *E* together. If this operation is performed carefully, the flat-head rivet in the countersunk hole will hardly be noticeable. If a good fit is not obtained, it may be necessary to hammer the rivet into the countersunk hole. File and finish surfaces until smooth and flush.

10. Rivet *A* to *B*. A round bar may be used against the rivet head to set the rivet. Flatten rivet into the countersunk hole. File and finish surfaces until smooth and flush.

11. Cover the bottom with felt or flock.

12. Finish with 3/0 steel wool and wax. ★

Bill of Materials

A—two pieces of 1" od tubing, 1¼" long
B—one piece, 1/8" x 1¼" x 14"
C—one piece, ½" x 1" x 1¼"
D—one piece, 1/8" x 2" x 3¾"
E—one piece, 1/8" x 3" x 4¼"
Two r-h rivets, 1/8" x 3/8"
One f-h rivet, 1/8" x 1"

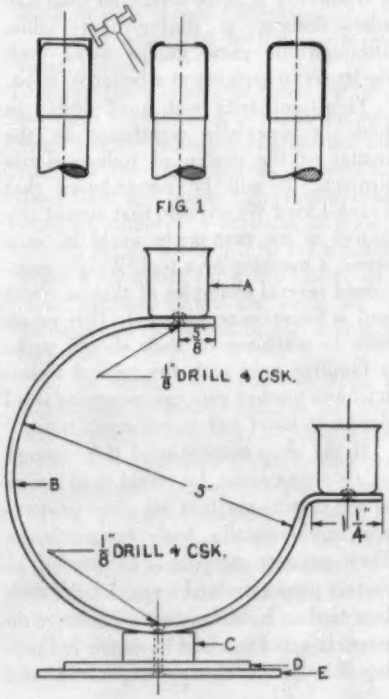
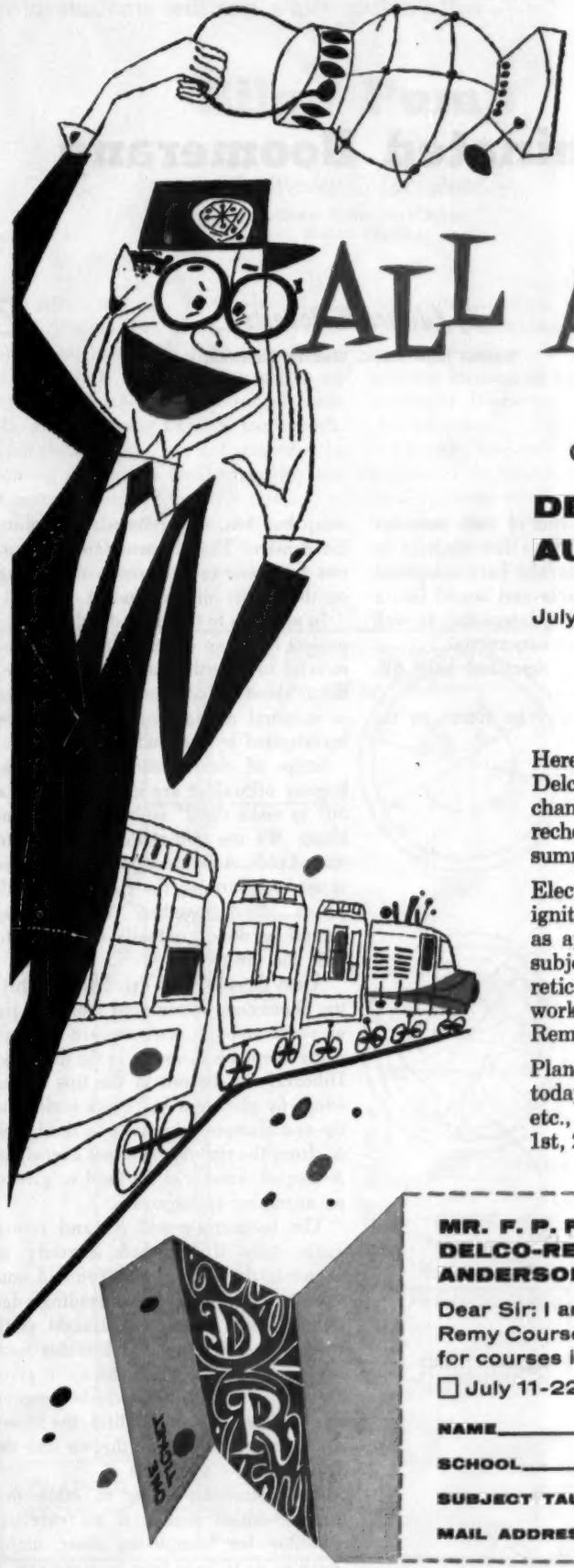


FIG. 1



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For that fill-in project try a

Laminated Boomerang

By Edward R. Roberts

Whittier High School, Whittier, California

For successful throwing, boomerang should be held vertically and thrown into the wind.

TOWARD the end of each semester there are usually a few students in the woodshop class who have completed their major projects and would like a small project that is interesting as well as inexpensive and educational.

The boomerang described here fills this bill very nicely.

The material may be found in the scrap box but, if purchased, it is quite inexpensive. The construction time varies from one to two weeks, depending on the ability of the student.

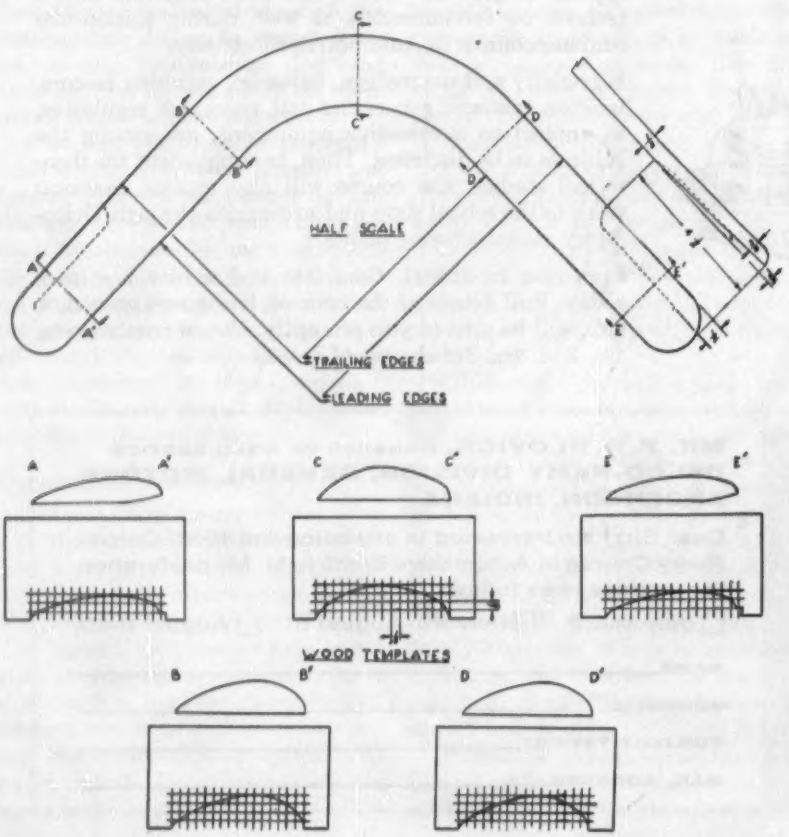
In addition to the skills developed, the project offers an opportunity for the instructor to have the students learn something about aerodynamics. Such topics as dihedral and air-foil design can be investigated by the student.

Strips of clear white pine and mahogany or walnut are cut ⅛" x ¾" x 30" to make the 2" width of the boomerang. We use two strips of walnut to one of pine. A jig or a boomerang press is used for forming the right angle with pieces glued together. The forming should be done gradually so as not to split the pieces.

After the glue has dried thoroughly, the boomerang is removed from the jig or press and the contours are formed, using templates as shown in the drawing. Dihedral can be put in the tips of the wings by placing a ¼" block under the tip and clamping the wing to the bench 6" from the tip. Allow to set overnight. A lacquer finish can be used to give it an attractive appearance.

The boomerang will fly and return again only if launched correctly as shown in the photograph. You will note that the boomerang has a leading edge on the inside when held straight vertically in the right hand. When this leading edge is thrown into the air it gives the necessary lift to make the boomerang fly. Until you become skillful, the boomerang should always be thrown into the wind.

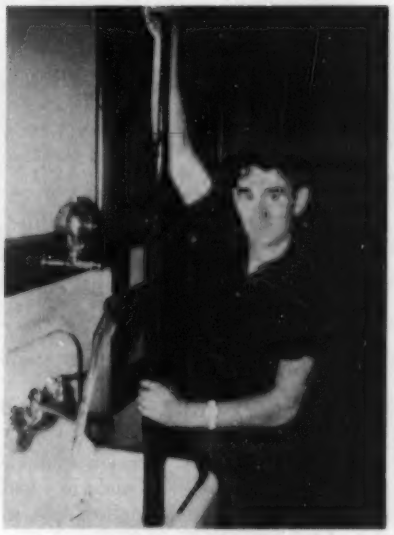
Youngsters are eager to make this project which makes it an excellent stimulus for completing their major work so as to have time to make one. ★



"Can Spring be far behind?"
your students will say while making this

Bilge Pump

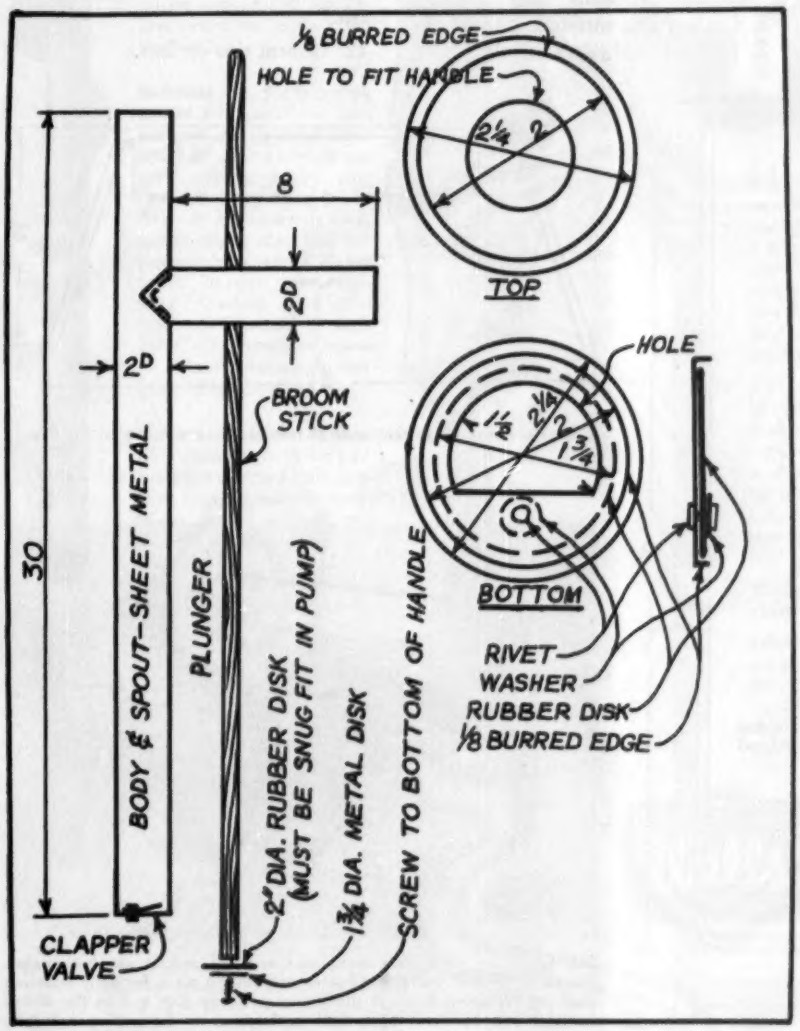
By Wesley G. Luckstead
John Deere Junior High School,
Moline, Illinois



SPRING will soon be here and boating enthusiasts will be getting their equipment in condition. For the younger enthusiasts, a bilge pump makes an interesting project for the school shop. My students have liked it very much. Even the boys who are not interested in boating get quite a thrill when they see it in operation for the first time.

The bilge pump shown here can be made with the simplest of tools, so it is well suited for any type shop. It incorporates, however, several important operations, including making a lock seam, soldering, chiseling, sheetmetal riveting, burring an edge, and forming a cylinder. It also teaches the principles of a lift pump.

To make the body of the pump, cut a piece of sheetmetal 6¾" x 30", then bend ⅛" hems in opposite directions on the edges for lock seams. Form into cylinder on slip roll over 2" outside diameter pipe, being careful not to crush hems shut. The cylinder is then slipped over a pipe and the seams are locked with a hand groover.



In making the spout, I provide my students with a pattern, since I am primarily interested in teaching metalwork and not in the drafting phase. However, this could be an excellent opportunity to teach pattern drafting.

The spout is made into a cylinder in the same manner. Then fit the spout on the body of the pump and trace around it. After an opening is chiseled for the spout, allowing ⅛" inside the traced line, the spout is soldered to the body.

The bottom is made by cutting out a disk 2¼" in diameter. A ⅛" burr is turned up on the edge of the disk on a burring machine, or by beating up with a hammer. Fitting the top and bottom on the inside makes a neater looking job. Then chisel out the semicircular hole. The rubber disk for the valve can be cut from an old inner tube. It is riveted to the bottom with a piece of sheetmetal scrap for a washer, after which the bottom can be soldered to the body of the pump.

A broom stick can be used for the handle of the plunger. The rubber disk to be attached to it must be cut out so that it fits the pump snugly. This disk and a 1¾" metal disk are screwed to the bottom of the handle.

The top disk has a hole cut in it for the handle and the edges are burred so that it fits inside the pump. It is soldered on after the plunger is put into the pump.

This project can be made without machines, if necessary. The hems can be bent over the edge of an angle iron, and the cylinders can be formed over a pipe. Burred edges may be raised with a hammer. ★

In any home, there's a place for this

Versatile Modern Metal Tray

By Donald G. Lux

Department of Industrial Education, University of Illinois, Urbana

WROUGHT-IRON and art-metal objects today are enjoying ever-increasing popularity. Because of their versatility with regard to materials and design, they are a welcome addition to the school metalworking program.

Projects of this type require considerable knowledge of the working characteristics of metals and an understanding of principles of design. They are made at relatively low cost and take a comparatively short time to construct, thereby allowing for greater variety in the program.

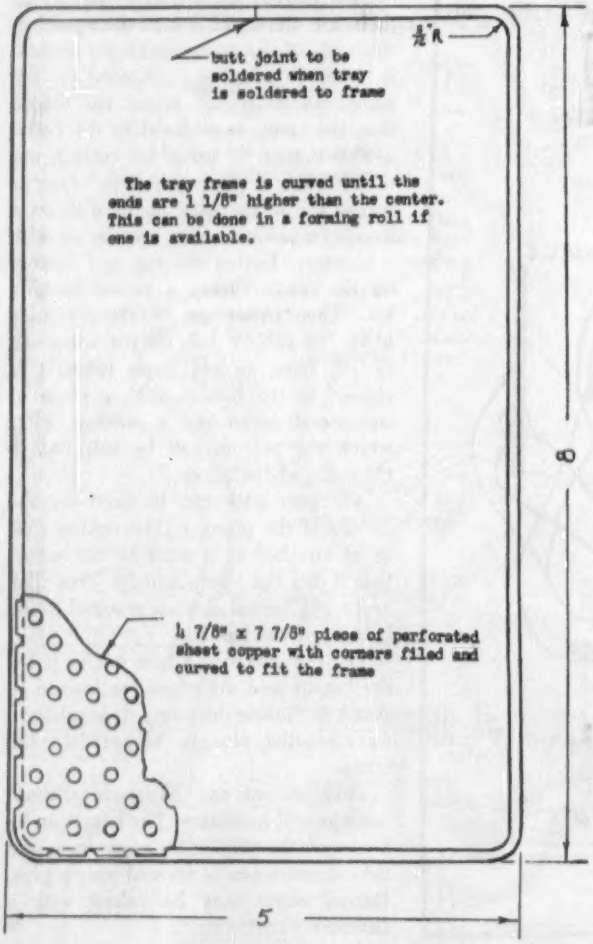
The design shown in the accompanying photograph may be changed in many ways through substitution of materials, dimensions, or leg styles.

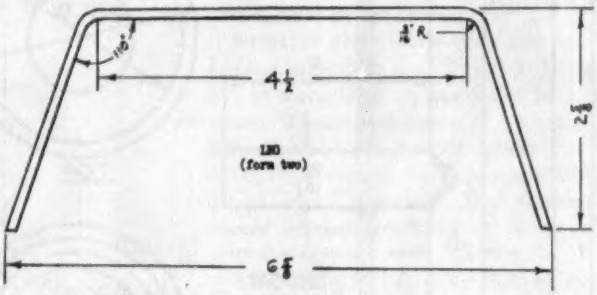
Bill of Materials

1 piece perforated copper (or perforated or expanded steel) 24 gage, 4⅞" x 7⅞".
1 piece brass rod (or wrought iron or cold rolled steel) ⅛" round x 26".
2 pieces brass rod (or wrought iron or cold rolled steel) ⅛" round x 10".
4 wooden, plastic, or rubber tips for legs.
Suitable finishing material for metals selected.

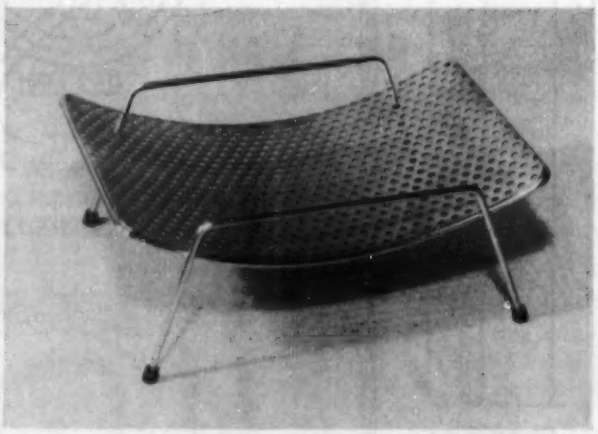
Procedure

1. Cut out appropriate materials.
2. File ends and edges smooth.
3. Bend the tray frame.
4. Curve the tray frame.
5. Round the tray corners to fit frame.
6. Curve the tray to fit frame.
7. Solder or spot weld the tray to the tray frame.
8. Bend the legs.
9. Silver solder or braze the legs in place.
10. Clean and polish metal.
11. Finish project with suitable metal finish.
12. Cement tips on legs. ★


½" R
butt joint to be soldered when tray is soldered to frame
The tray frame is curved until the ends are 1 1/8" higher than the center. This can be done in a forming roll if one is available.
4 7/8" x 7 7/8" piece of perforated sheet copper with corners filed and curved to fit the frame
8
5



Legs are secured so that ends of tray are even with top of the legs.



This handsome object has many uses and will delight any homemaker. Placed in the hall, the tray will serve as a resting place for daily incoming mail. In the living room, it doubles as a candy dish and in the dining room it can be used for a fruit centerpiece or for piping hot rolls.

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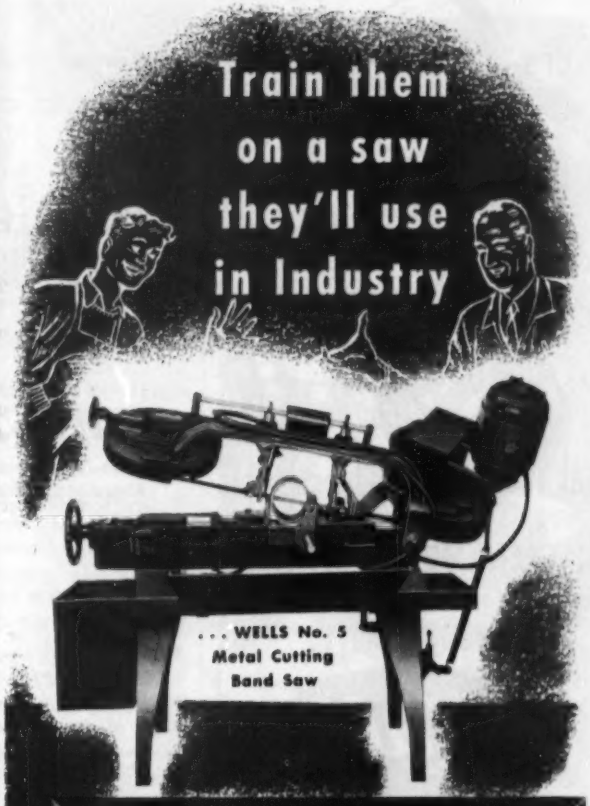

HERE'S a utility, metal cutting band saw that *will handle* all the horizontal *cut-off jobs around the school shop.* Here's a band saw that *will develop the basic skills* necessary to operate industry's most technical cut-off saws. Most important of all, here's the band saw that *your students will use time and again in industry.*

The same features that have made the Wells No. 5 so popular in industry make it ideal for the school shop. Its functional design provides for efficient and easy operation. It is ruggedly built to increase productivity and trim cutting costs. Moderate initial cost and low maintenance add to the money saving features of Wells Saws.

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SU-154

Numerous operations are involved in making this

Plastic Pin-Up Lamp

By Alan L. Beamer

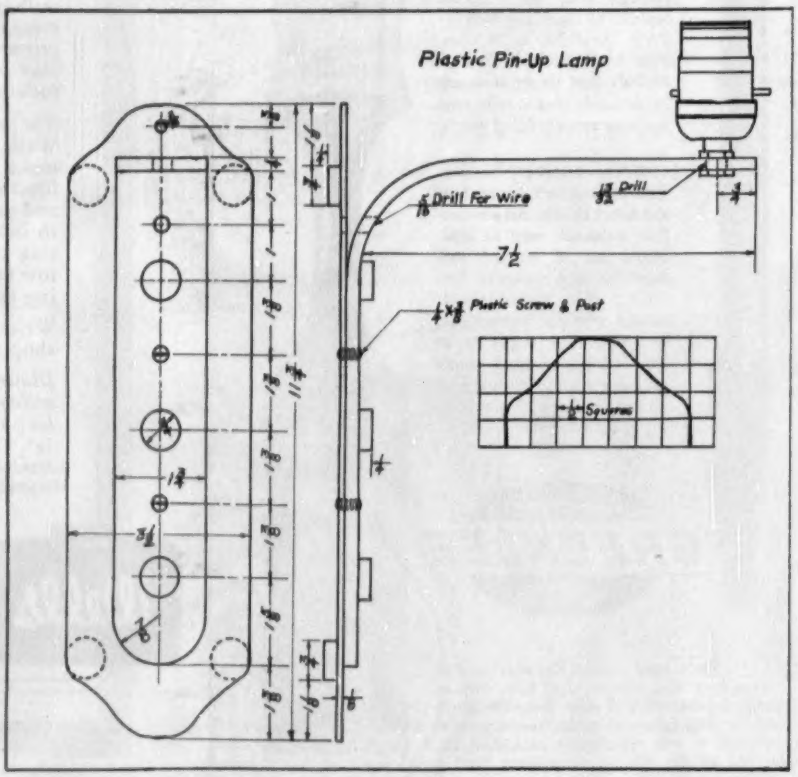
Supervisor, Vocational and Adult Education, Alexandria, Virginia, Public Schools

THIS novel pin-up lamp is a challenging project for the student who is interested in working with plastics. It involves basic operations in the manipulation of acrylic plastics such as laying out a pattern, transferring it to sheet plastic, sawing, sanding, polishing, annealing, bending, drilling, cementing, and assembling.

For learning purposes the student should make out his own bill of materials and working procedures.

The back can be made of colored acrylic plastic (the one shown is green) either ⅛" or ¼" thick. The arm was made from ¼" clear plastic. The arm can be fastened to the back with either plastic screws or 8-32 f-h machine screws covered with a plastic cap. Plastic screws can be turned on the lathe from rod stock and the holes tapped.

The round decorations on the arm were made from colored rod stock and the feet were cut from clear rod stock. ★



Worthwhile to build, fun to own

Robot Clock

By George P. Pearce
Albuquerque, New Mexico

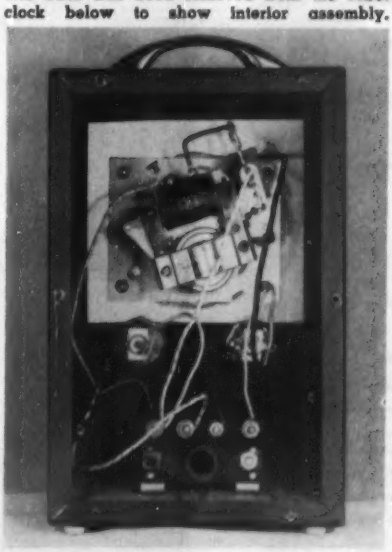
HERE is a project that offers a great deal in learning opportunities as well as being a very useful piece of equipment in either the home or the school.

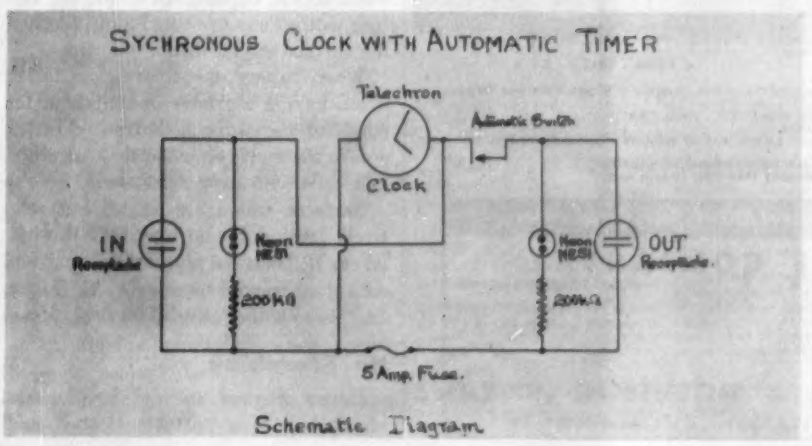
This compact, portable robot clock can be used to teach the fundamentals of electricity, problems of circuits and wiring, and the action of an automatic timer, in addition to offering experience in metalworking or woodworking, depending on whether the case is made of metal or wood (or plywood). The clock, with its tell-tale lights and automatic cut-off, can be used in the schools for timing plating baths, motor-driven agitators, electric driers, battery chargers, etc. At home it can be used to turn off the coffee percolator, small radio, toaster, or other appliances that consume 660 watts or less.

All that is necessary to do to operate this handy little robot clock is to plug the electric device into the "out" receptacle, set the control dial regulating the time that the current is to be on, snap the switch, and forget it. Even if there should be a power shortage, it will make no difference. The timer will operate for the required amount of time, for the switch will not cut off the power until the current has run for the designated time.

The device is built around a Telechron clock timer mechanism. The wiring is simple, as can be seen from the details of the circuit shown in the schematic diagram. Note that there are two small neon lights in the circuit. One of these glows the instant the clock circuit is energized and the other when the timed output circuit is switched on. The output circuit light will continue to glow for the time set on the control dial. It goes out the instant the switch cuts out the experimental circuit. These pilot lights consume only 1/25 watt each and are almost everlasting—more than 10,000 hours. ★

The back has been removed from the robot clock below to show interior assembly.





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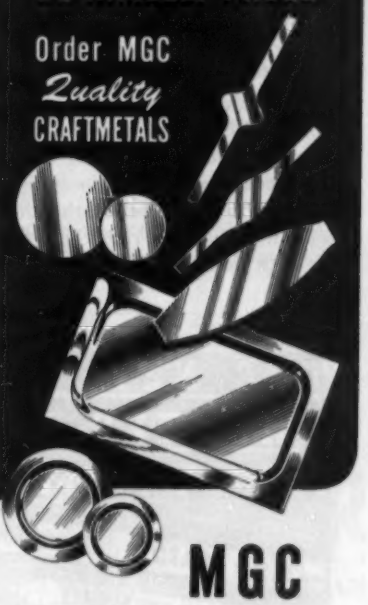

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No Waste With This

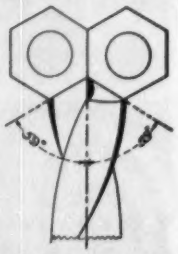
An ordinary hand-lotion bottle equipped with a dispenser is a perfect measuring device when adding water to the new powdered synthetic-resin glues. A student now gets just the right amount of water in the mixture rather than flooding it with water from the faucet. The water is also much more convenient this way since it is kept near the glue container at all times.—*R. G. Wagoner, Southeast Missouri State College, Cape Girardeau, Mo.*

Improve His Time After School

Punishment may be educational if the offender puts his time after school into a useful job. A file of 3x5 cards with projects listed will give the "detentionist" plenty to do.

Shop improvements such as project mockups, push sticks, belt guards, cleaning and polishing tools, sharpening chisels, and many others, can be educational. If you think he does a good job, commend him or grade him accordingly. — *Don Kinnaman, Junior High School, Rocky River, Ohio.*

Short-Cut for Drilling



If you don't have a drill-point gage, here is a simple method for determining the correct drill-point angle for a twist drill.

For most drilling, a drill should be ground at 59° on each side of the centerline, or have an overall point angle of 118°. This can quickly be checked with two hexagonal nuts, as shown in the illustration.—*Earl G. Tyler, Bayport High School, Bayport, L.I., N.Y.*

Keeps Things Shipshape

To catch chips from the metal shaper, place a sheetmetal box with an extended flap to fit under the rail of the shaper. This eliminates some of the mess and the job of cleaning up afterward.

Drill two holes in the flap to receive bolts by which the box may be secured to the bed. Most shapers have holes at this point in the bed; if not, they may easily be drilled. Sturdy gage metal should be used for the box.—*R. M. Woodbury, Wellesley Public Schools, Wellesley Hills, Mass.*

New Life for Work Tables

When work tables or bench surfaces become unsightly after years of use in the school shop they may be rejuvenated with two basic materials, either 5/16" or 5/8" plyscore or hardwood flooring.

Plyscore is a plywood product generally used for wall sheathing and flooring under wall-to-wall carpeting, linoleum, or tile. Cut the plywood to the same dimensions as the old surface. The plywood should be fastened to the old surface with screws or coated nails, leveling the surface for hardwood flooring.

When laying the flooring material, avoid having a groove or tongue at the edges of the working surface. Finally, secure the metal or wood trim on edges and ends with proper fasteners.

Surfaces which are scored but relatively level and solid may be rejuvenated easily. Omit the plywood and proceed with flooring and trim.—*Ray C. Doane, St. Paul Public Schools, St. Paul, Minn.*

No Searching

Here's a good way of keeping the chuck key of a portable electric drill

THE NEW BOICE-CRANE MASTER-MONOTROL* 10-INCH TILTING ARBOR SAW

• CUTS A BOARD PLUMB SQUARE!
• RIPS SUPER STRAIGHT!
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Not to be confused with 10-inch saws of questionable quality and dubious accuracy designed for homecraft use only!

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Saw Blade Travel: 0 to 3¼"
Arbor Speed: 4000 rpm's
Capacity: Cuts off 15" wide, 1" thick
Cuts off 13⅞" wide, 3" thick
Rips to center of 6 ft. wide stock
Power: To 2 HP 3-ph., to 1½ HP 1-ph.
Arbor: ¾" dia.
Table Size: 36" w. x 27½" l. with extensions

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SINGLE CONTROL FOR POSITIONING BLADE
New Monotrol* saw blade positioning system reduces blade controls to a single large handwheel, plus a height lock and a tilt lock, all mounted on the front—equally convenient for right-handed or left-handed operators! No groping, no out-of-reach controls, fewer accidents, an amazing saving of time on variety work. 5% to 20% faster blade speed. Cuts faster, cleaner, smoother. Up to 44% more ripping capacity without extra attachments.

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Heretofore, enough power to cut full 3" hardwood in production was usually available only in 12-inch saws. In a Master-Monotrol* you have a selection of motors offering from a third to a half more power than others accommodating only small frame motors. Boice-Crane full powering guarantees freer sawing, reduced hazard of accidental kickbacks when freeing stock from a choked blade.

Other new features:
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Star-stop switch which accidental manipulation can turn only "OFF", never "ON".
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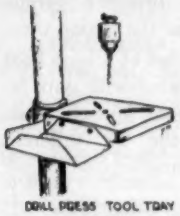
handy . . . tape it on the cord with some friction tape.—*Howard Atamian, Hilmar Unified Schools, Merced County, Cal.*

Glass-Cutting Kink

When it is necessary to cut the top from a glass jar, jug, or bottle for a project, the following method is sure fire. Fill the jar to the height wanted for the cut with ordinary machine oil. Insert in the jar a ½"d iron rod, heated almost white hot.

This brings the oil to the boiling point at its surface and a few seconds suffices to break the glass so cleanly that only a bit of dressing with a mill file is required to smooth the cut. Should the glass not crack, reheat the iron and reinsert in the oil. Let the oil cool before pouring out.—*Stanley Clark, East Bradenton, Florida.*

Drill-Press Tool Tray



DRILL PRESS TOOL TRAY

Often when setting up work on the drill press you need three hands or at least six pockets to hold tools, fixtures, lubricant, and other items. We tried a small table near the drill but this was unsatisfactory, so we decided to make a tool tray, similar to ones we had made for other machines. This has worked out very nicely.

The tray is easily and inexpensively constructed from .040 sheet steel or aluminum with the size determined by the size of the drill press. The front was left open and the sides were cut at 45° angles for ease of cleaning. The sharp corners are rounded for safety. The tray is attached to the table with two round-head machine screws at a slight angle to the back to prevent tools from sliding out. It can be painted the same color as the drill press.—*John R. Walker, Bel Air High School, Bel Air, Md.*

Quick Cutter

Try cutting four to six sheets of sandpaper at a time by using an old pair of tinsnips. It saves lots of time.—*J. R. Wolter, McKelvy School, Pittsburgh, Pa.*

Bullseye

Did you ever hold a piece of 9" x 12" or 11" x 15" or similar-sized drawing paper at arms length, take a quick look at it, and put a pencil dot on what seems to be the center? No? Try it some time. If you do it quickly and don't try too hard, the dot will be close to the center. This stunt is useful in the drawing room when it is not desirable to spend much time centering small drawings on the paper. The trick seems to be based on the same optical theory used in a rifle peep sight.—*Paul C. Hoopes, Abraham Clark High School, Roselle, N. J.*

Stop That Solder

Beginning students often have difficulty making a neat soldering job on sheet metal seams as they are likely to let the solder run all over the work. The solder can be kept in bounds by drawing heavy lines on each side of the seam with wax crayons and a straightedge. The wax checks the flow of the unwanted solder. If the solder should overflow onto the wax line, the wax prevents it from adhering to the metal and simplifies later removal of the solder.—*Henry Josephs, Gardenville, Pa.*

Short-Cut for Cleaning

Sanding discs and belts clean easier and give longer wear when a sanded piece of plastic is used to clean them.

Good scrapers may be made from scrap glass if you cut the corners round on the edge you are going to use for scraping. This eliminates corners cutting into the surface that is to be scraped.—*M. J. Gayhard, Provo High School, Igloo, S.D.*

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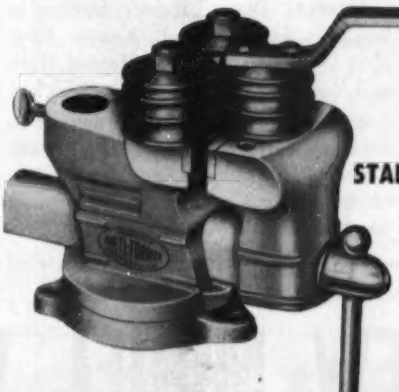
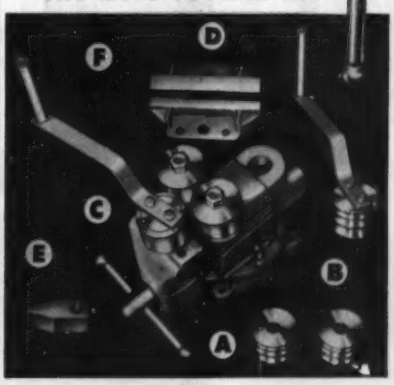


THE METL-FORMER KIT



The Metl-Former, a new light-metal combination tool, opens a new educational phase of school shop activity—*easy, inexpensive metal working!* The versatile Metl-Former forms, rolls, and bends light metals with fingertip tension—changes raw materials into useful and instructive wrought-metal tables, planters, and lamps. It illustrates important metal-working principles and applications, simply and easily. No additional strength is required to operate the Metl-Former and changes from one operation to another are quickly made. Mistakes in metal shaping are quickly erased by reversing the operation, cutting *costly* scrap to a minimum. Instructive values of the Metl-Former are unlimited. There's *double value*, as the Metl-Former also serves as an *extra* shop vise.

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NORMAN P. MITBY, former assistant director of the LaCrosse, Wis., School of Vocational and Adult Education, is now director of the Oshkosh, Wis., School of Vocational and Adult Education. He succeeds the late FRANK R. STEPP.

DEWITT HUNT, head of the school of industrial-arts education and engineering shopwork, Oklahoma A&M College, has announced his retirement at the end of the 1954-55 school year.

PAT H. ATTEBERRY has been named chairman of the department of industrial arts at Western Washington College of Education, Bellingham, succeeding ALAN PAWELEK, who resigned to enter industry.

GEORGE RENTSCH, former drafting instructor in Benjamin Franklin High School, Rochester, N.Y., has been appointed consultant in industrial arts in Rochester.

DONALD G. LUX of Ohio State University, Columbus, has been named assistant professor of industrial education at the University of Illinois, Urbana.

HARRY O. EIKEN, director of the Green Bay, Wis., School of Vocational and Adult Education, died unexpectedly on November 26.

CHARLES R. WALLENDORF, former administrative assistant at Woodrow Wilson Vocational High School, New York City, has been appointed director of the vocational education and extension board of Nassau County, New York. Since November 1953, Mr. Wallendorf has been on a leave of absence to conduct a survey to determine the need for vocational training in Nassau County.

CHARLES DIXON, former teacher at Westport High School, Kansas City, Mo., is now principal of Manual High and Vocational School, Kansas City.

U. GLENN WHIFFEN, who retired in September after 22 years as head of the industrial-arts department, State College of Washington, Pullman, died after a heart attack in November. He was 59.

ALVIN R. LAPPIN has been named assistant professor of industrial arts at Los Angeles State College of Applied Arts and Sciences, Calif.

LEONARD DAUGHERTY, supervisor of industrial arts, Louisville, Ky., public schools, writes that the announcement of his retirement in the January issue of SCHOOL SHOP came as a great surprise to him as he is "very much on the official active list." Our apologies, Mr. Daugherty. ★

Here Is a Way . . .

to publicize your industrial-education program

Nautical Know-How

STUDENTS at the State Vocational Trade School, Dothan, Alabama, put their knowledge to work and constructed first-place-winning float for the National Peanut Festival Parade, bringing parade honors to the school for the second time.

The float was a replica of a long boat carrying "sailors" rowing with oars labeled with trade school opportunities. Representatives of the 15 different courses manned the oars.

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Write for Bulletin D-14

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Phono-Oscillator . *from page* 12

dents desire to keep the completed units, the kits may be issued on a regular bill of material.

The following is a list of the parts necessary to construct this unit:

1 chassis
2 octal-base tube sockets
1 switch, SPST
1 oscillator coil
1 resistor, 22K ohms, ½ watt
1 resistor, .47K ohms, ½ watt
1 resistor, 2200 ohms, 1 watt
1 resistor, 470 ohms, ½ watt
1 resistor, 500 ohms, 20 to 25 watts
1 variable tuning capacitor, 140 mmfd.
1 electrolytic capacitor, 10 mfd. and 20 mfd., 200-400 d-c w-v
1 paper tubular capacitor, 0.1 mfd., 200 d-c w-v
1 capacitor, .02 mfd., 200 d-c w-v
1 capacitor, .002 mfd., 200 d-c w-v
1 tube, 12SA7
1 tube, 35Z4-GT
1 buss bar, 12" of No. 14 copper wire
11 #6-32 machine screws and nuts
4 terminal posts
3 feet of solid or stranded hookup wire (solid preferred)
1 foot of rosin-core solder
12 inches of antenna wire

Many components of this unit may be purchased from stores and companies specializing in surplus electronic parts and equipment at a fraction of the list price. The unit shown here was constructed from parts costing less than two dollars, exclusive of tubes. Many of these same parts may be used in wiring other basic circuits developed as laboratory exercises.

The oscillator coil may be constructed with very little trouble in the laboratory. It consists of a piece of cylindrical hardwood, 1¾" in diameter and 2" long. Four brass screws or brads are mounted on the cylinder to serve as soldering contacts for the coils. With #32 insulated copper wire, two coils, one consisting of 60 turns and the other of 65 turns, are wound on the wooden base.

The chassis may be made from 24S-0 .051, or 2S-½H .051 aluminum, or from 20-gage hot-rolled sheet steel. Because of the various physical forms in which these parts are available, a detail of the chassis layout is omitted. A chassis to fit the requirements of the components after they have been assembled may be designed and constructed with very little effort by using a master template as a guide. If a sheetmetal area is a part of the general-shop program, the layout and fabrication of the chassis could be used as an elementary exercise in the laboratory work.

Instruction Sheet

Previous experience of the students should be a guiding factor in determining what and how much instructional material is required in preparing the students for this area of training. To facilitate instruction in wiring this circuit, a detail job sheet will aid materially in presenting the necessary information and the proper procedure to follow.

Job Sheet "A" presented here is a step-by-step procedure for wiring and testing the two-tube phono-oscillator unit. It is quite obvious that this circuit can be completed using this sheet without ever referring to the schematic diagram. With this fact in mind, it is necessary to insert a word of warning relative to its use in teaching electronics. If this job sheet is not utilized in a careful and cautious manner, it will defeat one of the main objectives of a basic electronics area, namely, to learn to interpret schematic symbols and to read a schematic diagram.

It may be used, however, as a teaching aid by having the students read

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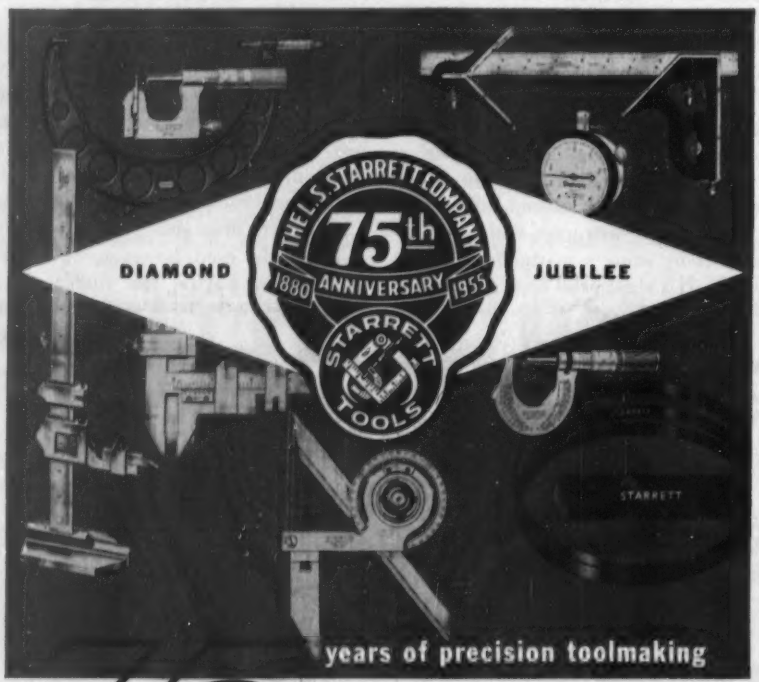
each wiring step, find that connection on the schematic diagram, and then fill it in on a phantom diagram. In this way, the student will learn what the symbols mean and how the components are connected together.

Time permitting, it is, of course, better to require the students to connect the circuit using only the schematic diagram. This procedure will naturally depend on how much time can be devoted to grounding the students thoroughly in the interpretation of schematic symbols and diagrams.

Another way in which the job sheet can be used is by giving it to the student to use to check the completed circuit before presenting it for approval and testing.

Other suggested topics for instruction sheets that will aid in presenting the material are:

1. How to Identify Resistors
2. How to Identify Capacitors
3. How to Test for a Shorted Capacitor
4. How to Use the Ohmmeter to Check Continuity
5. How to Check Tubes on the Tube Tester
6. How to Determine Ohmic and Wattage Ratings of Resistors
7. How to Tin a Soldering Iron
8. How to Make a Good (Mechanical and Electrical) Solder Connection
9. Electronic Tubes: Basic Parts and Functions
10. Techniques of Good Electronic Wiring ★



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Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Long May Confusion Reign

A FEW months ago we introduced our readers to a young lady whose name was Nellie. You may recall that, while Nellie was smart in some respects, her IQ was somewhat less than par. As a result of her low order of intelligence she found herself hopelessly confused in regard to certain educational philosophies which Willie—now her husband—spoke of with a distressing lack of enthusiasm. Apparently Willie, too, was confused in spite of his IQ of 140.

It appears that Willie's supervisor had attended summer school and, during his sojourn at the seat of learning, he had been impressed with the idea that the modern method of conducting a class is to give the pupils complete freedom of choice in regard to what they would make. This is in keeping with the thought that young people must be permitted to express themselves in any manner they chose. If they have the urge to throw paper wads, or if in their enthusiasm they decide to appropriate a leg from the piano in order to use it as a war club, these activities should be acceptable as a media through which teaching might be done.

Willie wished to please the supervisor and had no desire to quarrel with the idea of self-expression, but he had always believed that much more could be accomplished if the teacher felt that he had something definite to offer his pupils. He was of the opinion, too, that if the activities in which the pupils wished to engage contributed to the teacher's objective all would be well. However, when no relationship existed, or when it was so remote that its value was not immediately apparent, it had been his feeling that an effort should be made to convince the pupil that he should postpone activity on his personal project until a more appropriate season.

In the past it had been Willie's prac-

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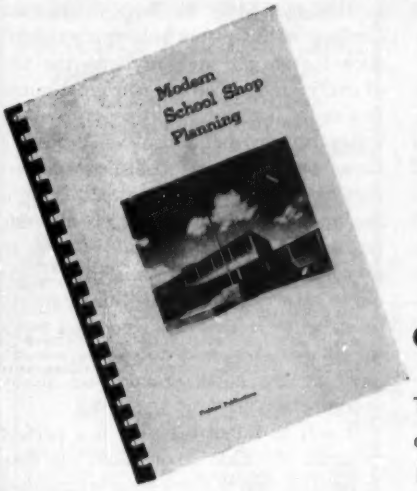

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- Equipping the Radio Shop

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- Planning the Machine Shop
- Equipping the Machine Shop

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tice to spend some time thinking over the work of the next day. Nellie would sit quietly by admiring the Great Mind at work as he planned his lesson for tomorrow.

He first decides what he proposes to teach during the morning session; he decides how he will approach the lesson: he selects the illustrative devices he hopes to use; and he decides on a method of testing which will reveal to him the measure of success he has had in his presentation. His is a planned program, with a planned method of attack.

The fact that Willie has a definite plan of procedure does not preclude using the interests of the class, but he feels that it is one of his functions to create this interest on the part of his pupils. He believes that this interest may be aroused more effectively if what they are expected to learn is made clear, and if its relation to the world in which they live is made evident.

In contrast to this planned procedure, Willie might have neglected his preliminary preparation. He and Nellie might have spent the evening with friends who had similar tastes in beer. They might have extended their social activities well into the morning feeling secure in the thought that, in the morning, the activities in Willie's class would be decided on automatically by the pupils themselves.

Since Willie teaches woodworking, it would be natural to assume that the activities selected by the boys would take the form of the broom holder or windowstick that bring such joy into the life of every ambitious boy. But no. Jimmie is a radio fan and he proposes to make a receiver, the diagram of which he has found in a magazine. Bill, being an ardent fisherman, is planning on making a sheetmetal tackle box. Ronald's interests run toward plastics, and he proposes to do some carving in that material in order to surprise his mother with an appropriate gift on Mother's Day. And Sam, the little stinker, does not propose to do anything but horse around and annoy everyone in the shop.

It will be noted that this is a perfect example of "Free Expression." It may be recalled that Willie's shop is equipped for woodworking, and there is not a soul in the class who cares a hoot about working in wood.

So Willie rises in the morning, eats his breakfast, kisses Nellie good-bye, and marches off to school, happy in the thought that the pupils will start off with enthusiasm, each on the project of his choice. What the actual results are we leave to your imagination, and one's imagination need not be unusually acute to appreciate the resulting chaos.

Need it be said that Willie puts in a hectic day, and he returns to his home in the evening trying to figure out where that summer-school professor got the dope upon which to base his beautiful theory.

It might be said, to put it mildly, that Willie was disturbed. He neglected to kiss Nellie when she greeted him at the door. The meal on which she had spent so much thought and effort might as well have been sawdust as far as Willie's appreciation was concerned. So, in turn, Nellie was disturbed also. They spent a miserable evening in complete silence, and went to bed with a feeling of frustration. And then some people wonder why they confessed to being completely confused. ★

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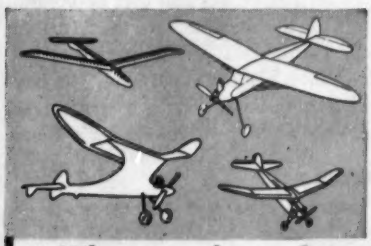

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In tune with the times is "Suggestions in Wrought Iron for the Modern Home", a series of Di-Acro Plans originated by Donald G. Lux, a University instructor in industrial education. Each project is an excellent example of functional design—something the student will be proud to take home. The Di-Acro Bender and accessories perform most operations on these projects. Other operations can be performed with the Di-Acro Brake and Di-Acro Roller. Use the coupon below to receive these new Di-Acro Plans,—"Suggestions in Wrought Iron for the Modern Home".

DI-ACRO BRAKE
Ten hand operated models from 6" to 24". Capacity 16 ga. mild sheet steel.

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Eight hand operated models from 6" to 42". Capacity 16 to 24 ga. mild sheet steel.

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☐ Send "Suggestions in Wrought Iron for the Modern Home".

Name_____

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Moral Values . . . . *from page* 11

an atmosphere of distrust within the group. By his theft, he has caused the owner to lose the time already consumed in the piece.

But thefts of finished projects by members of the class are rare. When one is stolen, it is almost invariably by someone not enrolled in industrial arts. The reason seems to lie in the fact that the pupils gain a real appreciation of the value of such projects to their builders. Others who do not have this understanding may see only an assembly of pieces of material without the personality of the builder.

It is the experience of many teachers that when tools are kept in tool rooms and are available only by signing them out, many more are missing than when they are kept on open panels completely accessible to all. The fact that the tools are openly available apparently suggests to pupils that they are trusted and they respond accordingly. Everyone wants to be trusted.

Honesty can also be incorporated in the project, wrapped up in materials and structures. The very design can suggest honest, straight-forward thinking by having its origin in simple, effective function that is clearly obvious. The function is not obscured by "gingerbread," fancy decoration, or inappropriate color and finish. The construction must be sufficiently honest to guarantee that the function of the project be possible for the desired time. A "dishonest" finish is one which is inappropriate to the function.

Honesty permits no imitations. One material should not be made to masquerade as another, as in the case of metal being grained to represent wood. When the student learns that his completed project becomes a record of himself, he is willing to settle for nothing short of honesty and genuineness within.

Truthfulness

The industrial-arts student learns to carefully examine advertising claims made for industrial products. He learns to detect exaggeration and liberty taken with truth. Sometimes he sees first-hand evidence of inferior quality masquerading as first quality. And as he learns to judge quality, he also learns to pick out the inferior, thus seeing the relation of truthfulness and untruthfulness to the cost of the product.

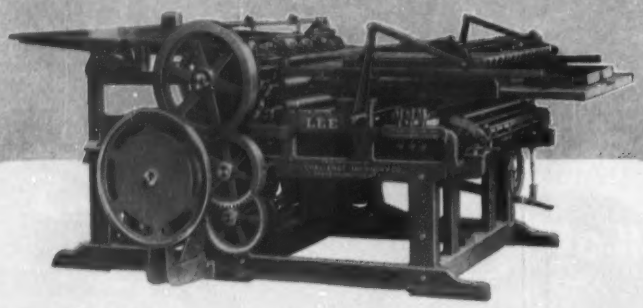
Bluffing is occasionally resorted to by the youngster who feels insecure in his group although he may be unaware of it. If asked by a teacher if he has ever run a machine lathe, the pupil's answer may be that he has and that he is familiar with the machine. As the instructor "checks him out" it is apparent to both that this is his first experience. The boy's father may have been a machinist and he sees himself in his father's image.

Sharing

Since it often takes two or more persons to solve a problem in an industrial-arts project, the sharing of ideas and solutions becomes a factor in strengthening friendships and providing satisfying experiences. As the pupil learns to control materials and machines, he acquires skills which he may use to help others at home or in the community. His ability to "fix it" or "make it" is most useful out of school. For example, there's the case of the teacher and his students who made and installed window screens and poured a concrete cap over a well to prevent contamination of water for an unfortunate family or the group of students which collected broken toys, repaired and distributed them to needy children.

Responsibility

When a student selects a project to design and construct, he assumes responsibility for its completion. With freedom goes responsibility. As he learns to con-



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No. 38, 26 x 38 inch bed size, carrier delivery, 2,500 per hour . . . Strong, rigid impression; two form rollers with rider roller, rack-and-screw and table distribution, impression trip, brake, counter, jogger.

IN A CLASS *By Itself*—

For the school shop, there's nothing like the Lee Two-Revolution Cylinder Press! It handles anything from a letterhead up to a 24 x 36 inch sheet — turns out quality work in black and color . . . on newsprint or book stock . . . at an adequate speed for the average run.

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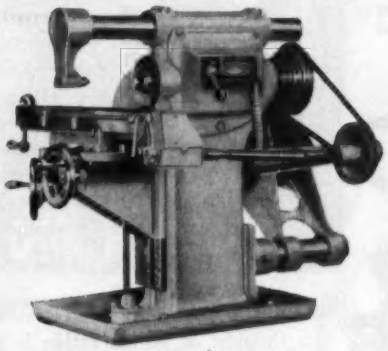
Their modest cost in proportion to their high educational worth makes them outstanding investments as practical teaching equipment.



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perform all standard metal milling operations in the simplest manner and are ideal for instructive operations. Accurate, rugged and so versatile they can practically reproduce themselves. Universal No. 4 power-feed model illustrated above. Also available in hand-feed and other power-feed models.

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(illustration at right)
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are also excellent instruction millers that are well within the cost range of school shops.

Descriptive literature and data on "U.S." and "Burke" milling machines gladly furnished on request.

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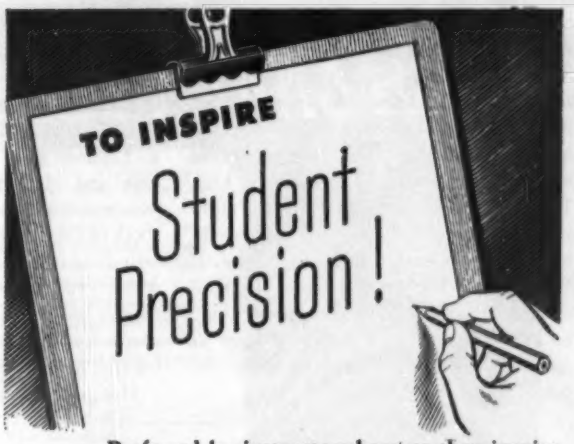

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WESTON
WESTON *Instruments*

trol materials and machines, he gains confidence in himself which in turn promotes a dependability in himself. When he is chosen to serve as safety director, for example, he becomes responsible for promoting safe behavior in the shop. As he accepts such an obligation he should know that others are depending on him. This makes his duty seem all the more important, and he gets real and meaningful experience in dependability. When it is his responsibility to shut off the ceramic kiln at the proper time, he knows that he can make the ware or melt it—this is an experience in dependability.

Respect

Respect for others takes several forms in industrial arts. Perhaps it shows up as respect for property as when a freshly painted project is set aside to dry. Excessive dust and handling could spoil it. Perhaps it is respect for their opinions and ideas which are tested when put to use in materials. It might be respect in the form of appreciation of jobs well done or of projects exhibiting much mastery of materials. After a first try on the potter's wheel, the youngster respects and admires the person who can handle it with ease.

If a project is well done, the boy receives commendations from the members of his group. Likewise, he learns to give praise, an expression of respect. Respect for others is demonstrated when tools must be shared, when each student so conducts himself that he can cause no one to suffer an injury. For example, instead of talking to a fellow pupil who is operating a circular saw, he waits until the other has finished the cutting.

Each project offers a student the opportunity to know pride in accomplishment. Accomplishment may be easily determined by the student himself as well as by his teacher and classmates. With the feeling of achieving comes respect for self.

Respect for work comes with industrial-arts experience. Satisfactions resulting from control and mastery of materials and tools, hands, and intellect (no matter how relative they may be) lend dignity to work. There is greater understanding of the role of the carpenter, the plumber, the mechanic, the machine operator in industry. There is greater appreciation of man's material culture as shaped by technological advances.

Doing for Others

Doing good for others without thought of remuneration is a spiritual experience that each of us frequently needs. Industrial-arts classes have innumerable opportunities to help others in specific, definite ways. This may take the form of constructing needed articles for the local Red Cross unit, making furniture or toys for a children's home, or sending tools to industrial schools in far away countries. There is as much opportunity for benevolent work in industrial arts as in church.

Fulfillment

When we industrial-arts teachers reach such a height that we consider the pupil, his growth and well-being, to be as important as the project he builds, we come face-to-face with the issue of moral and spiritual values. Before we can effectively incorporate and integrate them into the day-to-day shop experiences of the pupil, we ourselves must be convinced of their worth. This is only achieved as we so live.

On the basis of such considerations it seems that you and I have at our disposal the means for enriching our programs far beyond that prescribed by current standards. ★

SCHOOL SHOP's annual Suppliers Directory, appearing in the April issue, is already shaping up as one of the biggest and most complete we have ever published. Watch for it!

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above all else in school lathes

★ **SHELDON SAFETY**
. . . all belts, pulleys, countershafts, gears and motors are completely enclosed. Speed changes and gear-ratio changes are made by external shift levers.

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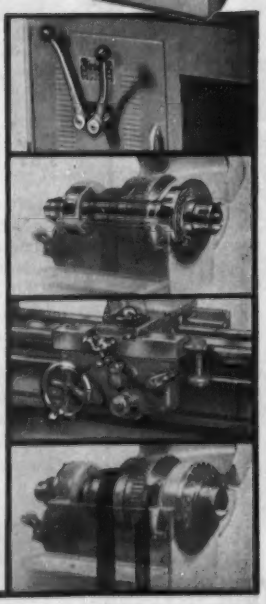
. . . "Zero-Precision" Tapered Roller Spindle Bearings permit student work to ten-thousandths of an inch, and hold this accuracy without constant maintenance.

★ **SHELDON CONTROLS**
SHELDON-taught students are ready to operate standard industrial lathes—are familiar with standard controls and the "big lathe feel".

★ **SHELDON CAPACITY**
The extra swing and greater collet capacity increase the range of possible student projects—from the "playing store" group to the practical. The extra power to the spindle, the speed range, weight and strength of SHELDON Precision Lathes permit heavy cuts, spinning and demonstration of correct use of new cast-alloy and carbide-tipped cutters.



Built by modern methods, with the finest machine-tool special machinery, on a continuous production line basis, these better lathes cost little more than ordinary school type lathes. *Write for Catalog*

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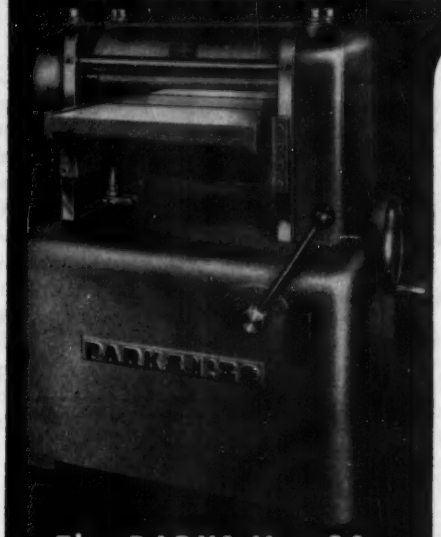

The PARKS No. 20
20" PLANER

Students advance quickly on Parks Planers because they find them easy to operate, safe, and accurate. And, since both the Parks 12" and Parks 20" Planers have been designed and precision-built for accuracy and high-speed line production in industry, they are ideally suited for the school shop because they give practical experience on the type of machines your students will eventually use. Both machines are priced low enough for even the most modest shop budget.

The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

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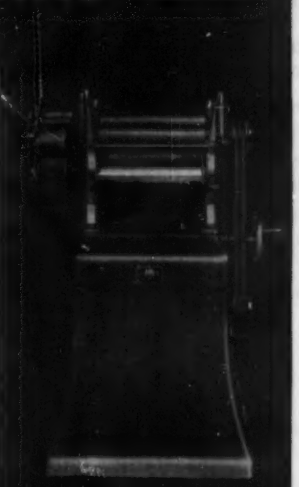

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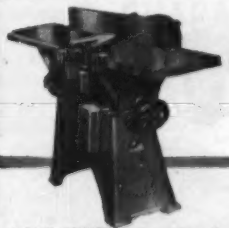
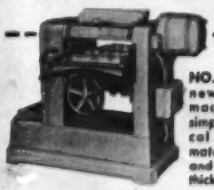


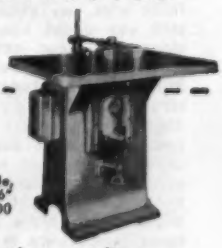
HAND JOINTER—compact and accessible. Built in 8" and 12" width. Table 6'2" long, maximum rabbet depth 9/16". Round, 3 knife safety type cylinder head, 3 HP 3600 RPM motor.

NO. 4 VARIETY SAW—for variety sawing in any shop! Standard table 44" long and 36" wide, plus 19½" extension for carrying rip gauge table.



NO. 2 SURFACER—new, streamlined machine. Features simplified, mechanical design. Takes material 18" wide and from ⅛" to 8" thick.

BAND SAWS — machine 20" diameter wheel illustrated. Floor space 24" x 36", horizontal capacity 20", vertical capacity under guide 11". Also 27" 32", and 36" machines available.



SHAPER—1" diameter spindle, with 4½" vertical adjustment, 36" x 26" table, spindle speed—8,500 RPM, floor space—34"x37".

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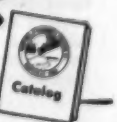

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News

HAPPENINGS IN INDUSTRIAL EDUCATION

Ford IAA Competition To Be Expanded in '55

FORD Motor Company's 1955 Industrial Arts Awards competition for students in the nation's junior- and senior-high schools this year will be expanded to include Alaska, Hawaii, and Puerto Rico for the first time, according to Dewey F. Barich, manager of the Ford educational relations department. Noncompetitive entries also are expected from several foreign countries, including Canada, Formosa, and Nicaragua.

The company has posted $50,000 for awards to be given the winning teenage craftsmen in the ninth annual IAA program. Winners of the 716 cash awards, as well as the 700 noncash winners, will be announced next summer. Special cash awards will be given entrants whose projects demonstrate exceptional ingenuity and creativeness.

The 1955 competition will be divided into 14 divisions—mechanical drawing, woodworking, electrical, graphic arts, leather, ceramics, jewelry, model, wrought metal, patternmaking and molding, plastics, machine shop, architectural drawing, and an open division.

Last year more than 20,000 students entered the program.

Korean GIs Seek Skills

VETERANS training under the Korean GI bill are aiming for high-skill jobs and away from "snap" courses, a Veterans Administration study recently revealed. The largest single group of veterans—one out of every five, or a total of 144,000 — enrolled for highly-skilled craft and trade occupations. Included are 37,000 who studied mechanics, with automotive mechanics leading two to one; 36,000 who chose radio and television; 21,000 in woodworking; and 18,000 in the construction trades. Smaller numbers selected other trades such as printing and electrical work.

Plan National Conference on Printing Education

THE International Graphic Arts Education Association and the Education Council of the Graphic Arts Industry have announced plans for a joint annual meeting to be held in July at Carnegie Institute of Technology.

This will be the first time the leaders in graphic-arts education and national trade organizations and industry representatives will have scheduled their annual meetings together to make up a national Conference on Printing Education and Training.

Homer Sterling, professor in Carnegie's school of printing management, is chairman of the 30th annual conference on printing education for IGAEA. Robert H. Caffee, president of William G. Johnston Company, Pittsburgh, is chairman of the Education Council's program committee.

Kansas IE Officers

CLARENCE C. YOUSE of Dodge City, Kan., Junior High School, is president of Kansas Industrial Education Association for 1954-55. D. W. Lake of Roosevelt Junior High School, Coffeyville, is secretary-treasurer.

Vice-presidents of the association for the year are Leon L. LeGresley, Topeka; John C. Powell, Kansas City; Leo G. Folck, Winfield; George M. Duerksen, Wichita; Homer M. Templin, St. John; and Robert Britten, Hays.

As president of the association, Mr. Youse also serves as one of the vice-presidents of the Kansas Vocational Association, of which Charles Mantz, vocational agriculture instructor at Smith Center, is president.

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performance and features equal to or surpassing machines costing up to 58% more!

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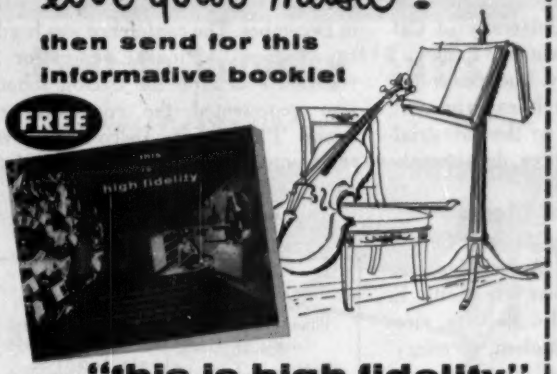

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A. C. input 110 volts; D. C. output 110 volts. P-1 for 5¼" x 13" chuck 6.8 amps. **$45.04**

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For 5¼" x 13" and 6½" x 18" sizes **$10.35**

Field discharge type for 8" x 24" and 10¾" x 37" **$18.90**

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Our new school shop catalog will be available early in 1955. It's going to be outstanding, complete and entirely new! Get your name on the list now. In the meantime, check our prices and compare our service.

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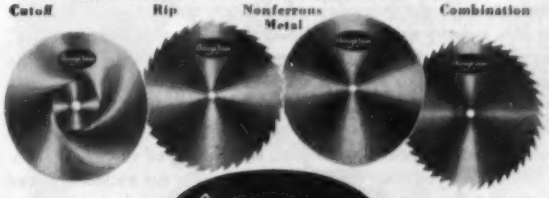

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Plan State Project Fair

PLANS and preparation for the fourth annual North Carolina State Project Fair, to be held May 7 in Myers Park High School, Charlotte, were made at the annual fall meeting of the North Carolina Industrial Arts Association, Nov. 13, at Lexington Senior High School.

A two-hour guided tour of the United Furniture Corporation was a highlight of the meeting. Tom Haigwood, president, presided at the business session.

IE Fraternity Honors Two Leaders

MU SIGMA PI, graduate fraternity in industrial education at Wayne University, Detroit, presented George Rideout an honorary membership and Hugh Oakley a national membership at its December meeting.

Mr. Rideout is leader of the Institute of Economic Education at Detroit, which has provided industry visits for 67,000 students and 16,000 teachers. Dr. Oakley is head of the department of industrial education at Murray State College, Murray, Ky.

Santa Barbara College Gets UHF Transmitter

The *California Industrial Education Association News* reports that an experimental ultra-high frequency television transmitter now belongs to Santa Barbara College of the University of California, a gift of Edwin W. Pauley, a regent of the University. The transmitter will be used for research, experimental, and teaching purposes by the industrial-arts and physical-sciences departments.

Los Angeles Assn. Elects

NEW officers of the Los Angeles County Industrial Education Association for the 1954-55 school year are Keith E. Gummere, president; Ed Roberts, vice-president; and Ted Knudsen, secretary-treasurer. David Taxis, coordinator of industrial arts for Los Angeles County, and Lee Ralston, director of vocation education and industrial arts for Los Angeles County, are advisors.

An Integration Conference

AN Educational Conference of the Automotive Industry Schools was held Oct. 19 at Wayne University, Detroit, for the purpose of integrating the automotive programs of these schools with the offerings of the industrial-education departments of colleges and universities. The meeting was held under the auspices of the National Association of Industrial Teacher Educators.

Materials were produced at the conference for distribution at the national meeting of the NAITE in San Francisco in December. The conference was headed by Andrew Althouse, supervisor of vocation education for Detroit schools, who represented the educators, and Frank Plovick of Delco-Remy, who represented the automotive interests. Douglas R. Sherman of Wayne University, was in charge of arrangements.

Convention Calendar

Illinois Vocational Association, Hotel Jefferson, St. Louis, Mo., Mar. 3-5, 1955.

Indiana Industrial-Education Association, Purdue Memorial Union Building, West Lafayette, Ind., Mar. 17-19, 1955.

New Jersey Vocational and Arts Association, Asbury Park, March 17-19.

Ohio Industrial Arts Association, Neil House, Columbus, Ohio, March 17-19.

New York State Vocational and Practical Arts Association, Utica Hotel, Utica, April 14-16.

Missouri Spring Conference on Industrial Education, Missouri University, Columbia, April 15-16.

Michigan Industrial Education Society, Grand Rapids, April 21-23.

Connecticut Industrial Arts Association, Teachers College of Connecticut, New Britain, April 22-23.

American Industrial Arts Association, Atlantic City, N.J., April 26-30.

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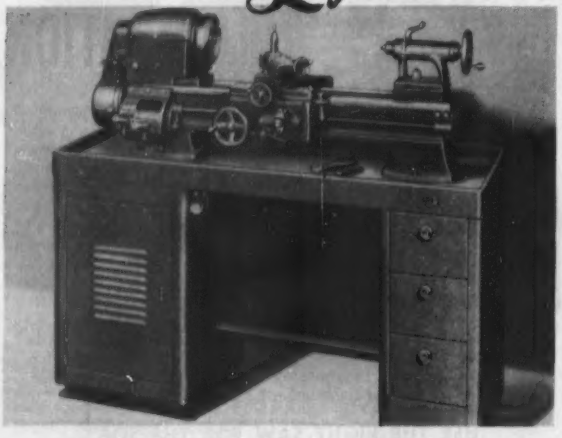

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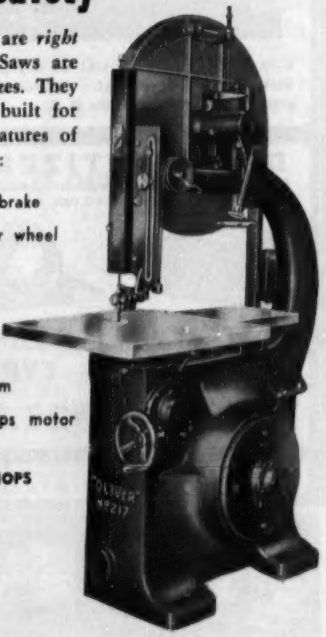

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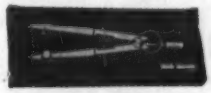

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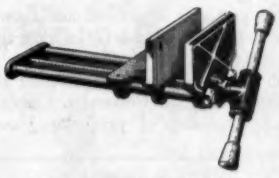

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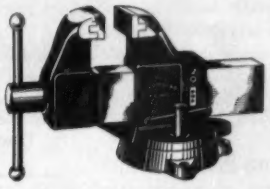

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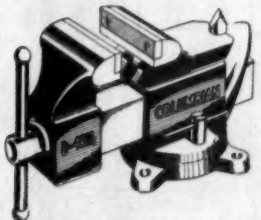

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Instructional RESOURCES

Books:

Printing and the Allied Trades. Karch. (Third Edition.) New York: Pitman Publishing Co., 1954. Pp. xvi+318. $3.50.

This third edition has been organized as a text for use by beginners as well as by more advanced students. It contains 20 chapters, each one dealing with a particular phase of the printing art. At the end of each chapter a number of questions are provided which may be used for class discussion.

There is a workbook section in which exercises, problems, and projects are suggested. The second part of this section contains a battery of objective tests based on the various chapters. Accompanying these tests is a grading table providing a basis upon which to evaluate the work done on each test.

The book can be used as a text either in the junior- or senior-high school, and it will also be helpful for beginners in a vocational school.

R. Randolph Karch is senior adviser in T&I Education, State Department of Public Instruction, Harrisburg, Pa.

All About Power Tools. Chicago: The Goodheart-Willcox Co., Inc., 1954. Pp. 192. $1.00.

This book contains detailed descriptions of how to perform the various operations encountered on the machines usually found in home workshops or in industrial-arts departments.

The many suggestions made should supplement instruction given by the teacher, and may inform him concerning methods and processes with which he is unfamiliar.

Occupational Training Plans. Columbus, Ohio: Division of Vocational Education, Ohio State Department of Education, 1954. Pp. xii+244. $3.50.

This is a compilation of training plans for 24 different occupations. The material is arranged in tabular form, and should serve as a guide to the coordinator who has the responsibility of integrating related information the learner should receive with the operations he is performing on the job.

Those concerned with the operation of cooperative programs will find the book most helpful.

Analyzing and Tracing TV Circuits. Kiver. Indianapolis: Howard W. Sams & Co., 1954. Pp. 131+7 diagrams. $3.00.

In preparing this book the author has assumed that the reader understands thoroughly the basic principles of electricity, radio, and television. His aim has been to assist the service man to interpret the information shown on the schematic for use in the receiver chassis, and to aid him in tracing various currents through the receiver.

With this end in view, the text begins by covering such topics as amplifiers, positive and negative tube voltage, and bias. This discussion is followed by one on the procedure to be followed in analyzing schematic diagrams, and in tracing circuits.

Another section is devoted to specific sections of a receiver, and suggests the best procedures to follow when a defect appears in any one of them.

Milton S. Kiver is the author of a number of books dealing with the problems of TV servicing.

Machine Shop Operations and Setups. Porter, Lawshe, and Lascoe. Chicago: American Technical Society, 1954. Pp. xii+397. $5.50.

This book is designed to meet the needs of classes in machine-shop techniques. The authors have included many new and widely-used operations, and have avoided the use of out-of-date practices.

The material included was decided on as a result of a series of studies, carried on by one of the authors. In these studies he attempted to discover what texts were preferred by teachers, the characteristics of these texts, the trade terms used in them, and the operations that teachers considered to be basic to the machine-shop trade.

The book is profusely illustrated and shows a number of effective methods of setting up different types of jobs.

Harold W. Porter is associate professor of T & I education, Purdue University. Charles H. Lawshe is professor of psychology, and

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Orville D. Lascoe is professor of manufacturing processes at the same institution.

Fundamentals of Electricity. (Third Edition.) McDougal, Ranson, Dunlap, and Graham. Chicago: American Technical Society, 1954. Pp. 415. $3.50.

This is the third edition of a book which was published originally in 1943. The book is well illustrated and deals with the elementary principles of electricity. In addition, it contains numerous diagrams as well as lists of symbols, formulas, and tables. It concludes with an excellent dictionary of electrical terms.

Wynne L. McDougal was formerly head, department of electricity, The Pullman Free School of Manual Training, Chicago. Richard R. Ranson is on the engineering staff of Cutler-Hammer Inc., Milwaukee.

Carl H. Dunlap is head, department of electrical trades, American School, Chicago. Kennard C. Graham is an electrical engineer, and is a consultant on apprentice training in the California State Department of Education.

Bricklaying Skill and Practice. Second Edition. Dalzell and Townsend. Chicago: American Technical Society, 1954. Pp. 195. $3.50.

This is a revised edition of a book which was published originally in 1951. It has been brought up to date, and a chapter has been added which deals with the laying of new types of brick.

J. Ralph Dalzell is a building and construction specialist and Gilbert Townsend is a member of a firm of architects in Montreal, Canada.

Pamphlets:

Suggested School Shop Layouts and Equipment is a booklet prepared by industrial-education department staff members of Texas Education Agency and the University of Texas. It covers the laying out and equipping of vocational shops to meet accepted industrial standards and yet be suitable for instructional purposes. Copies are $1 and may be obtained from the Industrial Education Department, Division of Extension, University of Texas, Austin.

Audio-Visuals:

The Art and Technique of Photoengraving is a sound-color film released by the Horan Engraving Company. The film runs 27 minutes and offers running explanatory comment as the shop procedure unfolds. It is available for school showings and may be obtained on free loan from Oscar Johnson, Horan Engraving Co., 44 West 28th St., New York, N. Y.

Chemistry of Steel is a new color filmstrip issued by the American Iron and Steel Institute, the second of two such filmstrips dealing with the science of iron and steel making. Intended primarily for use in high-school chemistry classes, one copy is available free to each school system on request. A teaching suggestions booklet is also available free in reasonable quantities. For copies write American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

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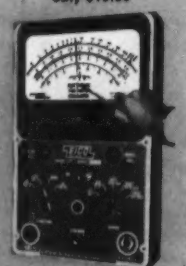

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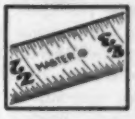

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News from INDUSTRY

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Cincinnati Milling's Toolmaster Available in Three Styles

A new milling machine, known as the Toolmaster, has been announced by Cincinnati Milling Machine Co. It is available in three styles: manual feed to quill, power feed to quill, and heavy-duty head. The standard ranges are 16" longitudinal, 10" across, and 17" vertical.

Several innovations are incorporated in the new machines. The overarm is patterned after the familiar Cincinnati design and mounted in dovetail ways in the turret unit. The kneebearing on the column is a departure from conventional design. Instead of a "wrap-around" bearing surface on the dovetail guide, the knee takes its bearing in the two V-surfaces formed between the dovetail guide and column face. This construction offers more resistance to deflection than the dovetail guide alone.

For more information write Cincinnati Milling Machine Co., Cincinnati 9, Ohio, mentioning SCHOOL SHOP; or *circle no. F-1 on the business-reply card.*

Delta Announces Entrance Into Metalworking Lathe Field

Delta Power Tool Division of Rockwell Manufacturing Company this month will introduce a new 11" metalworking lathe to mark Delta's entry into the metalworking lathe field.

The new lathe, developed and tested over a five-year period, is a cabinet model, variable-speed drive, with 24" capacity center to center and 1" collet capacity. Diameter of the hole through the spindle is 1⅜".

Outstanding feature of the new tool is a patented back-gear shift lever. This lever, located on the front of the machine within easy reach of the operator, eliminates any need for using wrenches, pulling-out pins, or opening guards to shift from direct spindle drive to back-gear spindle drive, loose or locked spindle, according to the manufacturer.

Another unique feature of the new machine is a perfected vari-speed drive offering a speed range of 44 to 1550 rpm with an infinite choice within that range. Speeds can be changed without turning off the machine. A new type of neoprene belt which minimizes wear and offers a minimum of five or six years' life is another feature of this new drive.

The lathe is offered with a choice between 2¼"-8 threaded spindle nose or L00 long-taper spindle nose.

John Claude, Delta national school sales manager, reports that although the tool is designed for use in industry as well as school shops, its chief purpose is to provide schools with a machine approximating the best industrial lathes at a price within reach of school pocketbooks.

For more information write Delta Power Tool Division, 200 N. Lexington Ave., Pittsburgh 8, Pa., mentioning SCHOOL SHOP; or *circle no. F-2 on the business-reply card.*

New Electronic Kit

Science Electronics, Inc., announces it is now offering a new Model T-100 Electronic Kit that will build 12 different radio circuits, a code-practice oscillator, and a code transmitter that will actually broadcast to a nearby radio set.

The kit is complete and ready to use. No tools are required and no solder is required. The kit utilizes a template, plug-board arrangement, and Jiffy Connectors. In using the system, a student lines up the holes in the template with the holes in the working panel. The mounting blocks are positioned by pressing the tapered retaining pins on the underside of the mounting block, through the holes in the template and into the holes in the Duron working panel. To build a radio that works, a Jiffy Connector is substituted for each black circuit line that is exposed on the template.

Full information and a free sample Jiffy Connector may be obtained by writing Science Electronics, Inc., 485 Main St., Cambridge 42, Mass., mentioning SCHOOL SHOP; or *by circling no. F-3 on the business-reply card.*

Adjustable Introduces Steel Track for Use with Hinged Clamps

A new principle in the use of clamps is now possible with the new No. 2203 Steel Track

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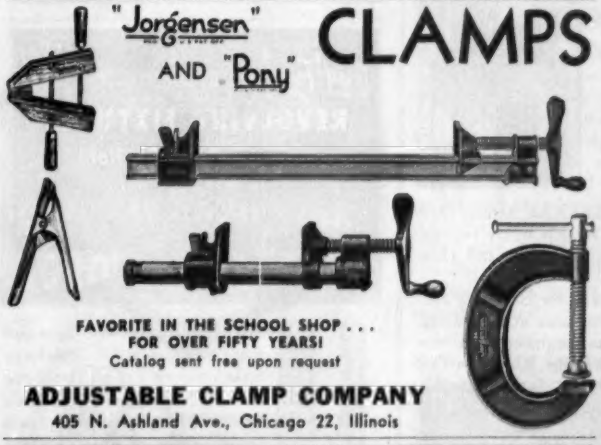

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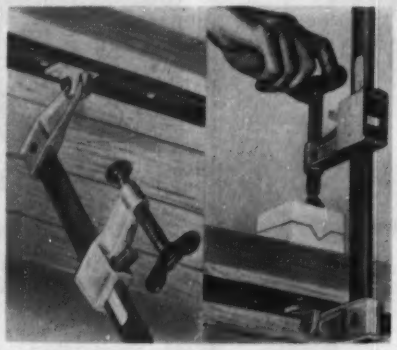
IF IT'S **Borden's** IT'S GOT TO BE GOOD

announced by Adjustable Clamp Co. for use with all styles of its recently introduced Jorgensen hinged clamps.



The hinged clamp, mounted in the steel track, now not only swings in an arc of nearly 180° up to or away from work, but it is also adjustable sideways along the length of the track installed. The manufacturer points out that in jigs and fixtures for production operations or on a saw horse or bench, the clamp user now can have his clamps always at hand, easily brought up to the work to be clamped.

The #2203 steel track is furnished in 24" sections. It can be cut to shorter lengths or butted together for longer lengths.

For more information write Adjustable Clamp Company, 405 N. Ashland Ave., Chicago 22, Ill., mentioning SCHOOL SHOP; or *circle no. F-4 on the business-reply card.*

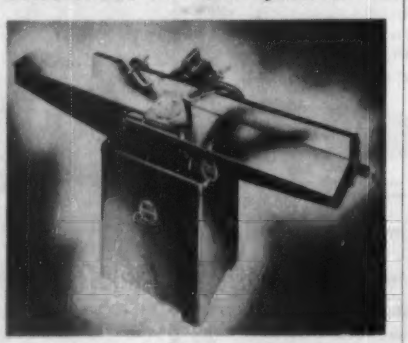
AAF Dust Collectors Designed For School Shop

The American Air Filter Company offers two models of dust collectors as the units most widely used in school woodworking shops.

The AAF Type D. Roto-Clone with Skimmer Precleaner is designed for use when the exhaust air is discharged to the outside. The AAF Airmat Dust Arrester is designed for schools where recirculation is required to conserve heat and eliminate drafts.

A bulletin, *Dust Control for School Woodworking Shops*, which contains additional information, and complete engineering advice may be obtained by writing American Air Filter Company, 215 Central Ave., Louisville, Ky., mentioning SCHOOL SHOP; or *by circling no. F-5 on the business-reply card.*

Boice-Crane Has New Jointers



New model long-table jointers—8" x 84" and 6" x 60"—were recently announced by Boice-

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Prices each: 3" size — $1.00; 6" — $1.60; 12"—$4.00. Quantity discounts for schools. Postage prepaid in U.S.A. when payment accompanies order.

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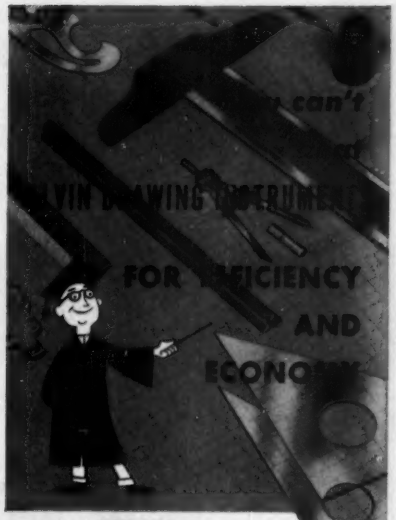

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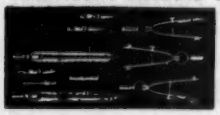

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Crane Company. Among the improvements noted for the new models is the fence control handle. The knob-type grip located midway along the top of the fence has been replaced with a long, cast, inverted U-type which provides the operator increased control of the fence with no interference when feeding stock through the machine.

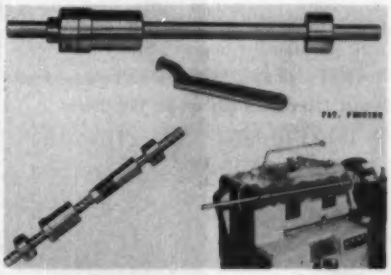
The outer mounting bracket for the work hold-downs has also been redesigned for greater utility and improved appearance.

The Boice-Crane 6" and 8" jointers are of welded all-steel construction and are claimed to have the longest fences of any 6" or 8" jointers.

For more information, write Boice-Crane Company, 938 Central Ave., Toledo, Ohio, mentioning SCHOOL SHOP; or *circle no. F-6 on the business-reply card.*

New Anderson Spindle Stop

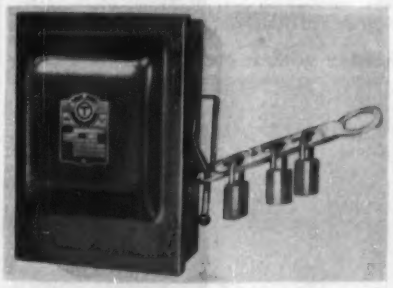
A new Anderson Spindle Stop has been introduced by Tage Anderson Machine Works. The new Spindle Stop, which is designed so that it can be used on any attachment or fixture that employs a draw bar, is available in a complete range of sizes to fit any common lathe spindle.



Consisting of only four parts (main body, body nut, body sleeve, and guide bushing), the unit can be completely installed in less than a minute, the manufacturer points out. It adds that the Spindle Stop may be used with collet as well as chuck or face-plate adaptations. It is said to prevent spindle distortion and to allow accurate duplication of production pieces.

For more information write Tage Anderson Machine Works, Rockford, Ill., mentioning SCHOOL SHOP; or *circle no. F-7 on the business-reply card.*

New Safety Lockout Device



A new lockout device for electric switch and fuse boxes has been announced by Industrial Products Company. The device, fabricated of cold rolled steel, opens and closes in scissors fashion, with the jaws at either end providing a secure lock around switch levers handles, and lock holes.

The device can be used as a safety measure in school shops to prevent unauthorized use of machines. It can also prevent students from

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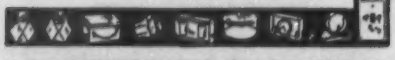

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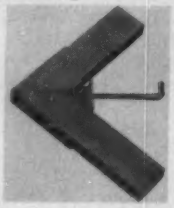
Full information can be obtained by writing Industrial Products Company, Philadelphia 33, Pa., mentioning SCHOOL SHOP; or *by circling no. F-8 on the business-reply card.*

New Gunver Corner Clamp



A handy pocket-size Corner Clamp with an unusually large capacity is now available from The Gunver Manufacturing Company. The new clamp is said to offer many advantages because its small size permits use where space is limited while its 2¼" capacity equals that of larger models.

Clamping action is said to force mitered, tenoned, or butt corners into a tight right-angle joint for glueing, welding, dowelling, or other fastening operations. Conveniently located openings in the back and sidewalls permit nailing, drilling, and the use of patent fasteners. The clamp is made of 3/32" cold rolled steel and is cadmium plated to insure resistance to warping and rusting.

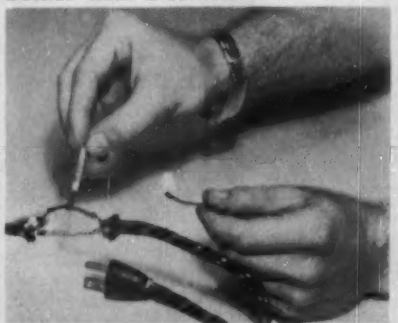
For more information write The Gunver Manufacturing Co., Hartford Rd., Manchester, Conn., mentioning SCHOOL SHOP; or *circle no. F-9 on the business-reply card.*

From Circular Saw to Jig Saw

A new unit which converts a table circular saw into a jig saw has been introduced by Versa Tool Manufacturing Company. Known as Circle-Jig the attachment can be set up in three minutes, the company says. It can take work up to 2¾" in thickness and allows the operator to cut to the center of 16" to 24" stock, depending on the size of the circular-saw table. It uses standard jig-saw blades.

For more information write Versa Tool Manufacturing Co., Lake Ave. at 4th St., Racine, Wis., mentioning SCHOOL SHOP; or *circle no. F-10 on the business-reply card.*

Solder with a Match



An easy way to solder permanently and quickly is with the new "Solder-Paste," according to the manufacturer. The paste is brushed on wiring or any broken metal object, heat is applied by a match or cigarette lighter, and

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Louis E. Jensen, Milwaukee Vocational and Adult Schools, Milwaukee, Wisconsin

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the sealed connection is made. A soldering iron or torch is not necessary. The price of $1 includes a brush applicator and sufficient "Solder-Paste" to make hundreds of joints.

Additional information may be obtained by writing American Products Corp., 422 S. Dearborn St., Chicago, Ill., mentioning SCHOOL SHOP; or *by circling no. F-11 on the business-reply card.*

Van Nostrand Purchases Rights to IA Books

The D. Van Nostrand Company, Inc., 259 Fourth Ave., New York City, has announced the recent purchase from the International Textbook Company of Scranton, Pa., of the publication rights to 15 industrial-arts and home-economics textbooks for schools, formerly published by International.

DonJer Moves to Brooklyn

DonJer Products Company, formerly of Woodside, New York, manufacturer of Suede-Tex and supplier of arts and crafts equipment, has recently moved to new and larger quarters in order to serve better the industrial-arts field. The new address of the company is 1398 Utica Ave., Brooklyn 3, N.Y.

New Literature

1955 Catalog of Films for Business and Industry lists all presently available McGraw-Hill audio-visual materials for industry. Of special interest is the listing of films on shop training. For a copy of the catalog write McGraw-Hill Book Co., Text-Film Dept., 330 W. 42nd St., New York 36, N.Y., mentioning SCHOOL SHOP; or *circle no. F-12 on the business reply card.*

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Washington . . . . *from page 52*

look into the manpower picture and indicate what the schools and colleges can do to preserve and nurture this most precious resource. Part of that inquiry into manpower has just been completed by another group, namely, the National Manpower Council. This is neither a Washington nor a governmental agency. It was, however, created by a well-known government official while still in private life, Dwight D. Eisenhower. For that reason, and because the National Manpower Council had some important things to say about vocational education, let's take note of its conclusions. "Secondary schools are doing an unsatisfactory job in vocational guidance and counseling," says the National Manpower Council, "and vocational education could be more closely adjusted to our changing technological needs."

In support of this conclusion, the Manpower Council presents "facts and findings" in its 300-page document. (It is entitled *A Policy for Skilled Manpower* and is available from Columbia University Press, New York City.) One item is worth noting here. Staff members of the Manpower Council held conferences with employers in Chicago, Detroit, San Francisco, and Atlanta. "What qualities do you look for in hiring young people for your establishments?" the employers were asked. And here is how the Council sums up the replies:

"The participants agreed they are far more concerned with general qualifications than with specific aptitudes or skills when they hire young people for jobs below the professional level. Proper attitudes, high general intelligence, and good ability in reading, writing, and arithmetic are valued above specific training. The application of this general rule is often modified by local labor market conditions, the situation of the industry, and the size of the firm.

"Other qualities sought are the abilities to recognize and tackle problems intelligently, to think creatively, to absorb training, to study on one's own, and to get along with other people. Perhaps most important are a state of mind which welcomes and readily adapts to change, and proper attitudes, such as willingness to work and ambition to advance. Many employers—although by no means all—were critical of today's young people and the high-school training they receive."

The Commission Reports but Congress Appropriates.—The secret of the Inter-governmental Relations Commission is slowly leaking out. It is predicted its subgroup on education will tell President Eisenhower that federal support for education is unnecessary and should be gradually withdrawn. The official word will come about March 1.

If the Commission actually says what it is bruited about it will say, vocational educators in Washington will not be pleased. Yet, they will not be overly concerned. They will remember the source of the views—a commission with no permanent place in the governmental structure and no link with Congress.

Congress last year took things in its own hands and legislated the amount of the appropriation—and it can do so again in 1955, regardless of President Eisenhower's budget recommendations, or the views of any external commission. It is true, however, that Congress this year may ask what vocational educators have done with the "extra" $5,-

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000,000 voted for 1954-55. The answer is still being compiled. But its main outlines are already apparent. The states spent about half the sum putting in vocational offerings where none had existed before. Certainly, several hundred high schools were enabled to provide their students vocational courses for the first time because of the Congressional increase of last summer.

It appears also that the other half of the "extra" $5,000,000 will be used to acquire much-needed equipment, stepping up teacher training, and intensifying research activities.

Hunt for Ludington.—About the first of this month, DeWitt Hunt, a gentleman from Oklahoma, is scheduled to report to the U.S. Office of Education as specialist in industrial arts. He will take the spot previously occupied by Dr. John Ludington, who after nearly seven years gets a new assignment. Dr. Ludington's new task will be to work with state and local officials as they develop curriculum materials dealing with civil-defense education. He consented to accept this off-beat assignment on condition that the industrial-arts post would be filled as rapidly as possible.

The man to fill it, Dr. Hunt, was head of the School of Industrial-Arts Education and Engineering Shopwork, Oklahoma A. and M. College, at Stillwater. Since Mr. Hunt is near retirement age (he was born in 1889) it is obvious that it is a temporary position for the Oklahoman and the entire status of the industrial-arts specialist in the federal government will have to be reviewed again in the near future.

Meanwhile, Mr. Hunt brings to Washington quite a parcel of honors and achievements in industrial arts. He is the author of many books, the latest being a *Manual for Hand Woodworking*. Another volume, *Care of School and Home Workshop Equipment*, is scheduled for publication during the year. He is author of innumerable articles, some of which testify to his deep interest in safety for the school shop. ★

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By MICHAEL PACA

Now Is the Time.—Time to reaffirm. Time to reassert. Time to repledge. . . . Talk to members of the Educational Policies Commission and you will hear them pepper their conversations with these phrases. The EPC has just reaffirmed, reasserted, and repledged its faith in public education. It has done so in a new document, *Public Education and the Future of America.* Now the EPC wishes educators would follow suit and rededicate themselves to the principles of public education.

Why this document at this time? Is the Commission worried about the attacks on public education? Not especially. It presents historical facts (the 95-page document is a fascinating pocket-history of American education) showing there have been attacks in our history before and education has come out stronger than ever. Each controversy was followed by creativity on the part of the public school—and by expansion.

No, it isn't the attacks from without that worries the Commission, but the lethargy from within. Each generation should reappraise the worth of its public schools, the Commission believes, and this is the 1955 effort. In previous policy pronouncements, the Educational Policies Commission has glossed over the vocational schools. This time the Commission is not guilty of this fault. After it describes how the public schools have helped to unite people of many backgrounds; how they have helped induct 30,000,000 immigrants into American life; how they have enriched the spiritual life of our people; after having said this much, the Commission adds: "The public schools have helped to make the American economy a miracle of production. . . . Well before the end of the nineteenth century, both business and labor leaders were calling upon public-high schools to serve the needs of American industry. Vocational courses, established to answer these demands, have since sent millions of skilled workers to the factories, shops, and farms of America."

As the Commission looks ahead, it sees an expanding economy for America. The increasing mechanization of factory, farm, and office will require "progressively skilled workers and an ever greater number of them." More important, "these skills must embrace not only mechanized operations, but also extraordinarily complex matters of personal behavior and human relations in vocational situations," according to the Commission.

The miracle of the American economy is predicated on a broad foundation of public education, the Commission continues. This education begins with the ability to read directions in shop or office and continues through the complex managerial and inventive skills needed to produce the high standard of American life. The vocational schools can be right in the middle of things, according to the Commission, by reaching every segment of the population ("needed talent is widely distributed among all groups"); by relating intimately to the community; and by counselling individuals to find their "most satisfying roles in the economic process."

Manpower & VE.—Next job for the Educational Policies Commission is to

(*Continued on page 50*)

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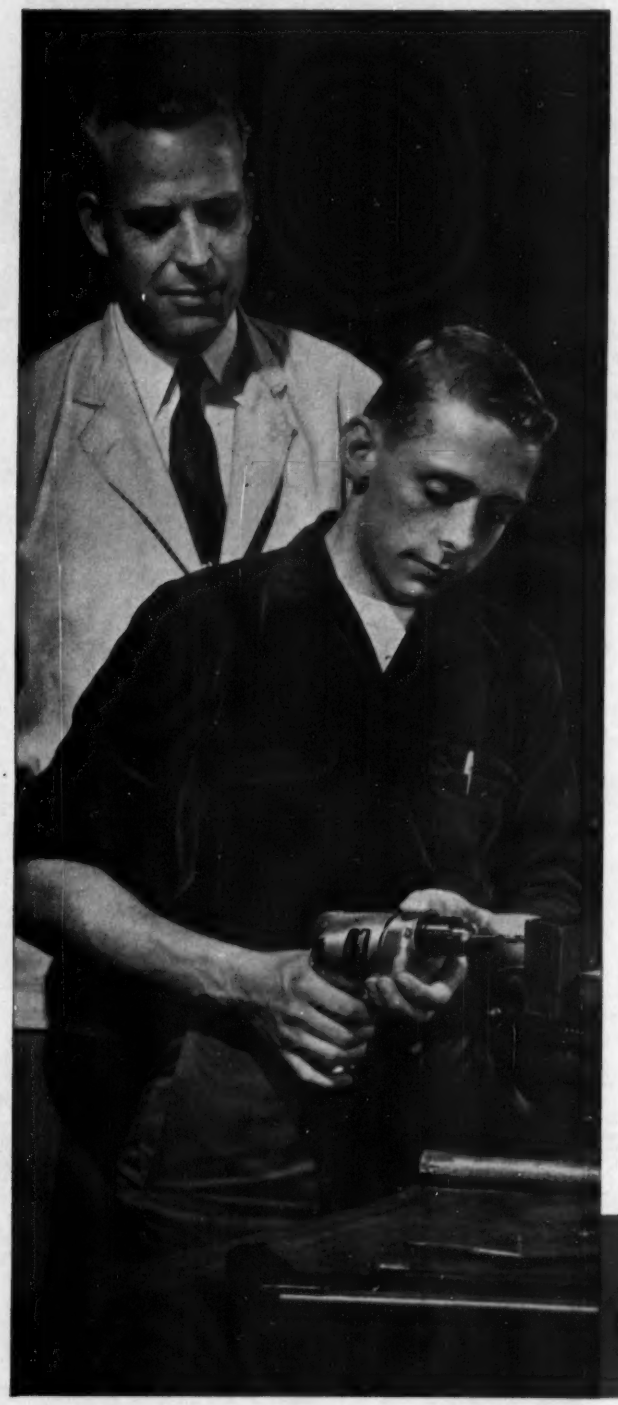

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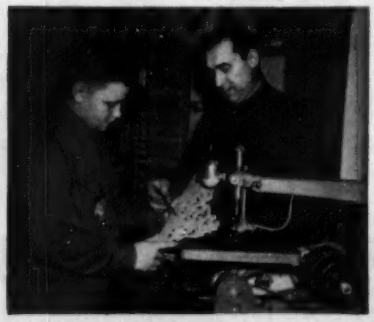

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